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GEMSTONES [ADVANCE RELEASE]

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Gemstones

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In 2018, the estimated value of natural gemstones produced in the United States was $9.47 million, and the estimated value of U.S. production of synthetic gemstones was $65.0 million (table 1). The total estimated value of U.S. gemstone production was $74.5 million. The value of U.S. gemstone imports was $27.7 billion (table 8), and the value of U.S. gemstone exports and reexports (combined) was estimated to be $22.4 billion. In 2018, world production of natural diamond totaled 147 million carats, of which an estimated 85.1 million carats were gem quality (table 11). The value of diamond imported into the United States in 2018 was $25.1 billion. This value was the combination of $22.4 billion of cut but unset diamonds greater than 0.5 carat, $2.07 billion of cut but unset diamonds less than 0.5 carat, and $609 million of rough or uncut natural diamonds (table 5).

In this chapter, the terms "gem" and "gemstone" refer to mineral or organic material (such as amber, pearl, petrified wood, and shell) used for personal adornment, display, or object of art because they possess beauty, durability, and (or) rarity. Of more than 4,000 mineral species, only about 100 possess all these attributes and are considered gemstones. Silicates other than quartz are the largest group of gemstones in terms of chemical composition; oxides and quartz are the second largest (table 9). Gemstones are subdivided into natural diamond and natural nondiamond gems. In addition, synthetic gemstones and gemstone simulants are discussed but listed separately from natural gemstones (tables 1, 7, 8, 10). Synthetic gemstones have the same chemical, optical, and physical properties as their natural gemstone counterparts. "Cultured" and "laboratory-created" are also terms used to refer to synthetic gemstones. Simulants have appearances like those of natural gemstone materials, but have different chemical, optical, and physical properties.

Trade data in this chapter are from the U.S. Census Bureau. All percentages in the chapter were calculated using unrounded data. Information on industrial-grade diamond and industrial-grade garnet can be found in the U.S. Geological Survey (USGS) Minerals Yearbook, volume I, Metals and Minerals, chapters on industrial diamond and industrial garnet, respectively.

Gemstones have captured the attention of humans since prehistoric times. They have been valued as treasured objects throughout history by all societies in all parts of the world. Amber, amethyst, coral, diamond, emerald, garnet, jade, jasper, lapis lazuli, pearl, rock crystal, ruby, serpentine, and turquoise are some of the first stones known to have been used for making jewelry. In addition to jewelry, gemstones are used for collections, decorative art objects, and exhibits.

Production

U.S. gemstone production data were based on a survey conducted by the USGS of more than 250 domestic gemstone producers. The survey provided a foundation for estimating the scope and level of domestic gemstone production during the year. However, the USGS survey did not represent all gemstone activity in the United States, which included thousands of professional and amateur collectors. Consequently, the USGS supplemented its survey with estimates of domestic gemstone production from related published data, contacts with gemstone dealers and collectors, and information gathered at gem and mineral shows.

Commercial mining of gemstones has never been extensive in the United States. More than 60 varieties of gemstones have been produced commercially from domestic mines, but most of the deposits are small compared with those of other domestic mining operations. In the United States, much of the current gemstone mining is conducted by individual collectors, gem clubs, and hobbyists rather than by commercial operations.

The commercial gemstone industry in the United States consists of individuals and companies that mine gemstones or harvest shell and pearl, firms that manufacture synthetic gemstones, and individuals and companies that cut and polish natural and synthetic gemstones. The domestic gemstone industry was focused on the production of nondiamond gemstones and the cutting and polishing of large diamond stones. Gemstone industry employment was estimated to be between 1,200 and 1,500 individuals.

Most natural gemstone producers in the United States are small businesses that are widely dispersed and operate independently from each other. The small producers have an average of three employees, including those who work part time. The number of gemstone mines operating from year to year fluctuates because the uncertainty associated with the discovery and marketing of gem-quality minerals makes it difficult to obtain financing for developing and sustaining economically viable operations.

The total value of natural gemstones produced in the United States was estimated to be $9.47 million during 2018 (table 1). This production value was a 3% increase from that in 2017.

Natural gemstone materials indigenous to the United States were collected or produced in every State. In 2018, there was production of at least $1,590 worth of gemstone materials in every State. The leading 13 States accounted for 95% of the total value of gemstones produced, as reported by survey respondents. These States were, in descending order of production value, Arizona, Oregon, Nevada, California, Montana, Maine, Arkansas, Colorado, Idaho, Utah, North Carolina, Tennessee, and New York. Some States were known to produce a single gemstone material—Hawaii produced coral and Tennessee produced freshwater pearls, for example. Other States produced a variety of gemstones—for example, Arizona's gemstone deposits included agate, amethyst, azurite, chrysocolla, garnet, jade, jasper, malachite, obsidian, onyx, opal, peridot, petrified wood, smithsonite, and turquoise. A wide variety of gemstones also was found and produced in California, Idaho, Montana, Nevada, North Carolina, and Oregon.

In 2018, the United States had only one active operation in a known diamond-bearing area, Crater of Diamonds State Park near Murfreesboro, AR. The State of Arkansas maintains a dig-for-fee operation for tourists and amateur collectors at the park; Crater of Diamonds is the only diamond mine in the world that is open to the public for collecting diamonds. The diamonds occur in a lamproite breccia tuff associated with a volcanic pipe and in the soil developed from the lamproite breccia tuff. The largest diamond found in 2018 was a 2.63-carat white diamond (Crater of Diamonds State Park, 2018). During 2018, 405 diamonds having an average weight of 0.190 carat were recovered at Crater of Diamonds. Of the 405 diamond stones recovered, 8 weighed more than 1 carat. Since the diamond-bearing pipe and the adjoining area became a State park in 1972, 33,294 diamond stones with a total weight of 6,670.48 carats have been recovered (Waymon Cox, Park Interpreter, Crater of Diamonds State Park, written commun., June 11, 2020). Exploration has demonstrated that this diamond deposit contains an estimated 78.5 million metric tons of diamond-bearing rock (Howard, 1999, p. 62). An Arkansas law prohibits commercial diamond mining in the park.

During 2018, there were many dig-for-fee operations and locations for mining and collecting gemstones across the country. Many of them were known for a particular gem type. Arizona had collecting locations for copper minerals, peridot, and turquoise; California had tourmaline collecting operations; Colorado had dig-for-fee amazonite, amethyst, aquamarine, smoky quartz, topaz, and turquoise locations; Idaho had garnet and opal mines; Montana had dig-for fee garnet locations and sapphire mines; Nevada had many dig-for-fee opal mines; North Carolina had emerald collecting locations; Oregon had many sunstone mines; and Virginia had collecting locations for amazonite, beryl, garnet, and staurolite.

In addition to natural gemstones, synthetic gemstones and gemstone simulants were produced in the United States in 2018. Synthetic gemstones that have been produced in the United States include alexandrite, azurite, chrysocolla, cubic zirconia, diamond, emerald, garnet, malachite, moissanite, ruby, sapphire, spinel, and turquoise. However, during 2018, only cubic zirconia, diamond, moissanite, and turquoise were produced commercially. Simulants of amber, azurite, chrysocolla, coral, lapis lazuli, malachite, travertine, and turquoise also were manufactured in the United States. In addition, certain colors of synthetic sapphire and spinel, used to represent other gemstones, are classified as simulants.

Synthetic gemstone production in the United States was valued at $65.0 million in 2018, which was an 18% increase compared with that in 2017 (table 1). Five companies in five States, representing virtually the entire U.S. synthetic gemstone industry, reported production to the USGS. Production estimates were made for companies that did not report production based on related published data, contacts with gemstone collectors, dealers and other synthetic producers, and information gathered at gem and mineral shows. The States with reported synthetic gemstone production were, in descending order of production value, North Carolina, California, New York, Maryland, and Arizona. The value of U.S. simulant gemstone output was estimated to be more than $100 million in 2018.

In 1954, scientists at General Electric Co. manufactured the first synthetic diamond grit using a high-pressure, high-temperature (HPHT) method. In 1956, the first commercially available synthetic diamond was produced by the HPHT method at General Electric. This method of growing diamonds has become relatively commonplace in the world as a technology for synthetic diamonds, so much so that thousands of small plants throughout China were using the HPHT method and producing synthetic diamonds suitable for cutting as gemstones. Diamonds of 1 carat or more are harder to manufacture because larger high-quality diamonds are difficult to produce consistently, even in the controlled environment of a laboratory using the HPHT method (Linares, 2013). After more than 60 years of development, several synthetic diamond companies were able to produce relatively large high-quality industrial diamonds that had the same characteristics and properties as mined diamonds, and billions of carats of synthetic diamonds were manufactured annually by the HPHT process, mostly for industrial applications.

In 1954, a patent was issued for a diamond growth technique using chemical vapor deposition (CVD). The CVD technique transforms carbon into plasma, which is then precipitated onto a substrate as diamond. Initially, gem-quality CVD synthetic diamond was not possible, but in the mid-1980s, scientists discovered how to reproducibly grow small polycrystalline diamonds and films of microscopic diamond crystals to cover surfaces using the CVD process (Linares, 2013).

In the early 2000s, Apollo Diamond Inc. (Boston, MA) further developed CVD technology as a method for growing single, extremely pure, gem-quality diamond crystals that were large and suitable for use in jewelry. The CVD technique uses high-energy microwaves in a chamber to energize a methane gas into plasma, which then precipitates carbon atoms onto flat diamond wafer seeds as diamond. In developing this process, synthetic diamond producers discovered the temperature, gas composition, and pressure combination that resulted in the growth of a single diamond crystal and were able to produce synthetic stones that ranged from 1 to 2 carats (Wang and others, 2003, p. 268–272). The size of the diamonds produced was limited only by the size of the diamond seeds and the growing chamber (table 10).

Scio Diamond Technology Corp. (Greenville, SC) acquired the diamond growing process patents and equipment from Apollo Diamond in 2011 (Sim, 2016). The average size of synthetic diamond crystals grown by Scio Diamond more than doubled, and Scio Diamond produced synthetic single-crystal diamonds for finished sizes that averaged from 0.75 to 2 carats for jewelry. These CVD diamonds were appropriate also for industrial uses because they were free of defects and could be grown along a specific crystallographic plane (Scio Diamond Technology Corp., 2015; Bailey, 2016). Scio Diamond continued producing synthetic single-crystal diamond stones until the end of 2016, when they shut down their production facility owing to financial difficulties (Scio Diamond

Technology Corp., 2017). The company did not report any production during 2018. In November 2018, Scio was sold to Adamas One Corp., a Nevada-based company, and the sale was completed in December (Bates, 2019a, b).

Charles & Colvard, Ltd., in North Carolina, was the only U.S. manufacturer of moissanite, a gem-quality synthetic silicon carbide and an excellent diamond simulant. The company used a proprietary patented technology. Moissanite was marketed for its own gem qualities; it exhibits a higher refractive index (brilliance) and higher luster than diamond. Moissanite's hardness is between that of corundum (ruby and sapphire) and that of diamond, which makes it very durable. Charles & Colvard reported that moissanite sales increased by 3% to $27.9 million in 2018 compared with $27.0 million in 2017 (Charles & Colvard, Ltd., 2018a, p. 2–3; 2018b; 2019).

U.S. mussel shells are used as a source of mother-of-pearl and as seed material for culturing pearls. The value of U.S. shell production decreased by 4% to $325,000 in 2018 compared with $337,000 in 2017 (table 1). These mussel shell data include only freshwater mussel shells. In some regions of the United States, shell from mussels was used more as a gemstone based on its own merit rather than as seed material for pearls. This shell material was processed into mother-of-pearl and used in beads, jewelry, and watch faces.

Consumption

Although the United States accounted for only a small portion of total global gemstone production, it was the world's leading diamond and nondiamond gemstone market, accounting for more than 35% of world gemstone consumption in 2018. In the United States, the majority of domestic consumers designated diamond as their favorite gemstone. The popularity of diamonds is evidenced by the diamond market accounting for 92% of the total value of the U.S. gemstone apparent consumption. The total value of U.S. apparent consumption for all gemstones during the year was estimated to be $26.0 billion, an 18% increase compared with $22.0 billion in 2017. The U.S. apparent consumption for unset gem-quality diamond during the year was estimated to be $23.9 billion, a 14% increase compared with $21.0 billion in 2017. Domestic markets for natural, unset nondiamond gemstones totaled $2.07 billion in 2018, which was more than double the $1.01 billion in 2017.

U.S. jewelry store annual diamond retail sales increased to $39.7 billion in 2018 from retail sales of $34.6 billion in 2017. U.S. retail holiday season sales in fine jewelry increased to $6.3 billion, an increase of $0.2 billion from that in 2017. During 2018, e-commerce sales showed strong growth, which extended to jewelry markets. This trend was demonstrated by the 2018 jewelry sales of Blue Nile Inc., an online jewelry retailer that reported that global net sales had increased to $539.9 million (Munn, 2019, p. 12).

Prices

Gemstone prices are influenced by many factors including qualitative characteristics such as beauty, but also quantitative characteristics such as clarity, defects, demand, durability, and rarity. Diamond pricing is complex; values can vary significantly depending on time, place, and the subjective valuations of buyers and sellers. More than 14,000 categories are used to assess rough diamond and more than 100,000 different combinations of carat, clarity, color, and cut values can be used to assess polished diamond.

Colored gemstone prices are generally influenced by market supply and demand considerations and diamond prices are supported by producer controls on the quantity and quality of supply. Value of production and prices of gemstones produced and (or) sold in the United States are listed in tables 1, 2, and 3. Customs values for diamond and other gemstones imported, exported, or reexported are listed in tables 4 through 8.

De Beers Group UK Ltd. (London, United Kingdom) companies remained a significant force in the diamond market, influencing the price of gem-quality diamond sales worldwide in 2018, with an estimated 34.5% share of global rough diamond sales. De Beers companies produced 23% of total global diamond quantity and 33% of total global diamond value. Since 2000, De Beers' control of world diamond pricing has decreased gradually. Flexible pricing mechanisms have set the stage for new methods of rough diamond sales in addition to rough diamonds being sold through a limited number of sightholder sales, the method used for years by De Beers. Rough diamonds also were sold by auctions, placed sales, tender sales, and term contracts (De Beers Group UK Ltd., 2019, p. 7).

Foreign Trade

During 2018, total U.S. natural gemstone trade with all countries and localities was valued at $47.4 billion, which was a 9% increase from that in 2017. Total U.S. natural gemstone trade with all countries and localities, excluding reexports, was valued at $28.6 billion. Diamond accounted for 92% of the 2018 gemstone trade total value, excluding reexports. In 2018, U.S. the quantity of cut diamond imports increased by 8% compared with that in 2017, and the value decreased by 13% (table 5). U.S. import quantities of rough and unworked diamond in 2018 increased by 59% and the value decreased by 43% compared with those in 2017 (table 8). These decreases in value were due in part to excess supplies of both cut and rough diamond stones. The United States remained the world's leading diamond importer and was a significant international diamond transit center as well as the world's leading gem-quality diamond market. In 2018, U.S. export and reexport quantities of gem-grade diamond decreased by 5% compared with 2017, and the value increased by 6%. The large quantity of reexports revealed the significance of the United States in the world's diamond supply network (table 4).

Import values of natural gemstone increased by 11% to $27.4 billion for the United States in 2018 compared with $24.7 billion in 2017. This increase was due to large increases in cut diamond and cut nondiamond gemstone import values. The largest import value increases were for those from Lesotho and Russia, with a total value of $131 million or 22% (by value) of uncut diamond imports, and those from India, Israel, and South Africa, with a total value of $11.3 billion or 46% (by value) of cut diamond imports. Import values of synthetic gemstone increased by 35% to $263 million in 2018 compared with $194 million 2017 (tables 7, 8). This increase was owing to large increases in synthetic gemstone imports from Belgium, China, Hong Kong, India, Israel, and the United Arab Emirates with a combined value of $236 million accounting for 90% (by value) of total domestic imports of synthetic gemstones in 2018 (table 7). The marketing of imported synthetic gemstones and enhanced gemstones as natural gemstones and the mixing of synthetic materials with natural stones in imported parcels continued to be an issue for some domestic jewelers and sales companies in 2018. In addition, some simulants were marketed as natural or synthetic gemstones during the year, as in previous years.

World Review

The worldwide gemstone industry had two distinct sectors—diamond mining and marketing and nondiamond gemstone production and sales. Most diamond supplies were controlled by a few major mining companies; prices were influenced by consumer demand and supply availability and, to a lesser extent, by controlling the quality and quantity of the diamonds relative to demand, a function that had been performed by De Beers sightholder sales. Unlike diamond, nondiamond gemstones were primarily produced at relatively small, low-cost operations with few dominant producers; prices were influenced only by consumer demand and supply availability.

In 2018, global natural rough diamond production decreased by 3% to 147 million carats from 151 million carats in 2017. The value of worldwide rough diamond production increased by 3% to $14.5 billion from the 2017 value of $14.1 billion (Kimberley Process, The, 2018, 2019). Of the 147 million carats of total natural diamond production, 85.1 million carats (58%) were gem diamond, and 62.2 million carats (42%) was industrial diamond (table 11). Most production was concentrated in a few regions—Africa [Angola, Botswana, Congo (Kinshasa), Namibia, and South Africa], Asia (northeastern Siberia and Yakutia in Russia), Australia, North America (Northwest Territories in Canada), and South America (Brazil). The world's leading rough diamond producers, in descending order by quantity, were as follows: Russia, producing 43.2 million carats or 29% of total world production; Botswana, with 24.4 million carats (17%); Canada, with 23.2 million carats (16%); Congo (Kinshasa), with 15.1 million carats (10%); Australia, with 14.1 million carats (10%); South Africa, with 9.91 million carats (7%); and Angola, with 8.41 million carats (6%); other countries produced 9.02 million carats (6%) (table 11). In 2018, Russia was the world's leading gem diamond producer with 28%; followed by Canada, 27%; Botswana, 20%; Angola, 9%; South Africa, 5%; Congo (Kinshasa), 4%; and Namibia, 3%. These seven countries produced 96% (by quantity) of the world's gemstone diamond output in 2018 (table 11).

During 2018, PJSC ALROSA (Moscow, Russia) and De Beers Group remained the two leading diamond producers in terms of quantity and value. ALROSA's production was 24% of total global quantity and 22% of total global value. De Beers' production was 23% of total global quantity and 33% of total global value from mines in Botswana, Canada, Namibia, and South Africa. The third-ranked company was Rio Tinto Group (Melbourne, Victoria, Australia), which produced 12% of total global production quantity and approximately 5% of global production value from a mine in Australia and a partial share of a mine in Canada (De Beers Group UK Ltd., 2019, p. 7).

In 2002, the Kimberley Process Certification Scheme (KPCS), an international rough diamond certification system, was agreed upon by United Nations (UN) member nations, the diamond industry, and related nongovernmental organizations to prevent the shipment and sale of conflict diamonds. Conflict diamonds are diamonds that originate from areas controlled by forces or factions opposed to legitimate and internationally recognized Governments and are used to fund military action in opposition to those Governments or in contravention of the objectives of the UN Security Council. The KPCS monitors rough diamond trade in both gemstone and industrial diamond. The KPCS includes the following key elements: the use of forgery-resistant certificates and tamper-proof containers for shipments of rough diamonds; internal controls and procedures that provide credible assurance that conflict diamonds do not enter the legitimate diamond market; a certification process for all exports of rough diamonds; the gathering, organizing, and sharing of import and export data on rough diamonds with other participants of relevant production; credible monitoring and oversight of the international certification scheme for rough diamonds; effective enforcement of the provisions of the certification scheme through dissuasive and proportional penalties for violations; self-regulation by the diamond industry that fulfills minimum requirements; and sharing of information with all participants on relevant rules, procedures, and legislation and examples of national certificates used to accompany shipments of rough diamonds. The European Union assumed the chair of the KPCS from January 1 through December 31, 2018. As of December 31, 2018, the 56 participants represented 82 countries (including the 28 member countries of the European Union counted as a single participant). The participating countries in the KPCS account for approximately 99.8% of the global production and trade of rough diamonds (Kimberley Process, The, 2020).

Globally, the production value of rough natural gemstones other than diamond was estimated to be more than $1.15 billion in 2018, based on total value of world rough nondiamond gemstone exports. Most nondiamond gemstone mines are small, low-cost, and widely dispersed operations that are often in remote regions. Foreign countries with major gemstone deposits other than diamond are Afghanistan (aquamarine, beryl, emerald, kunzite, lapis lazuli, ruby, and tourmaline), Australia (beryl, opal, and sapphire), Brazil (agate, amethyst, beryl, ruby, sapphire, topaz, and tourmaline), Burma (beryl, jade, ruby, sapphire, and topaz), Colombia (beryl, emerald, and sapphire), Kenya (beryl, garnet, and sapphire), Madagascar (beryl, rose quartz, sapphire, and tourmaline), Mexico (agate, opal, and topaz), Sri Lanka (beryl, ruby, sapphire, and topaz), Tanzania (garnet, ruby, sapphire, tanzanite, and tourmaline), and Zambia (amethyst and beryl). In addition, pearls are cultured throughout the South Pacific; Australia, China, French Polynesia, and Japan were key producers in 2018.

Worldwide diamond exploration spending increased by 43% to $297 million in 2018 from $208 million in 2017. This $297 million global diamond exploration budget was 3% of the $9.62 billion global nonferrous mineral exploration budget. The success rate in diamond exploration has been estimated to be less than 1%, and no major new deposits have been discovered in more than 20 years (Kumar, 2019; Petra Diamonds Ltd., undated).

Botswana.—Rough diamond production in Botswana was 24.4 million carats during 2018, a 6% increase compared with 23.0 million carats in 2017, accounting for 17% of total global production. This Botswana diamond production was valued at $3.53 billion, a 6% increase compared with that in 2017 (Kimberley Process, The, 2018, 2019).

The Jwaneng diamond mine in the Kalahari Desert of south-central Botswana was wholly owned by Debswana Diamond Co. (Pty.) Ltd. (a joint venture of the Government of Botswana and De Beers). The company was planning the Cut 9 expansion project to extend the mine life by 11 years and extract an additional 50 million carats. During 2018, the company was conducting feasibility studies for the project (Motsoeneng, 2018).

Canada.—Rough diamond production in Canada was 23.2 million carats in 2018, about the same as that in 2017, accounting for 16% of total global production. Diamond production in Canada was valued at $2.10 billion, a slight increase compared with that in 2017 (Kimberley Process, The, 2018, 2019).

The Diavik Diamond Mine in the Northwest Territories was jointly owned by Rio Tinto Group (60%) and Dominion Diamond Corp. (40%). The Diavik Diamond Mine was Canada's largest diamond mine in terms of carat production. The mine plan was built on four diamond-bearing kimberlite pipes. Four very high grade kimberlite pipes—A21, A154 South, A154 North, and A418—were mined in 2018. The Diavik Diamond Mine began an extension project of the A21 kimberlite pipe pit in 2016 that was in development during 2017 and 2018. The first kimberlite ore from the A21 kimberlite pipe was delivered in March 2018. The mine was expected to continue production into 2025 (De Beers Group UK Ltd., 2017, p. 7; 2018b, p. 7; Rio Tinto Group, 2020).

The Gahcho Kué Mine in the Northwest Territories commenced commercial production in March 2017 and continued to produce throughout 2018. The mine, with an approximate mine life of 12 years, was jointly owned by De Beers Canada, Inc. (51%) and Mountain Province Diamonds Inc. (49%). The mine owners anticipated average annual diamond production of 4.5 million carats (Diamond Loupe, The, 2018; De Beers Group UK Ltd., 2020).

Quebec's first diamond mine, the Renard Mine, was wholly owned by Stornoway Diamond Corp. The mine had a 14-year mine life and an expected average annual diamond production of 1.6 million carats. Stornoway announced in September 2018 that it had completed rampup of its planned sustainable underground mine production (Diamond Loupe, The, 2018; Stornoway Diamond Corp., 2018).

Lesotho.—Rough diamond production in Lesotho was 1.29 million carats during 2018, a 15% increase from that in 2017, but accounted for less than 1% of total global production. Diamond production in Lesotho had a value of $377 million, a 10% increase compared with that in 2017 (Kimberley Process, The, 2018, 2019).

The Liqhobong diamond mine in the Maluti Mountains of northern Lesotho began ramping up production in late 2016 and had its first full year of commercial production in 2018, when reported production was 836,000 carats. The mine was owned by Firestone Diamonds plc (75%, London, United Kingdom) and the Government of Lesotho (25%) (De Beers Group UK Ltd., 2017, p. 7; Firestone Diamonds plc, 2018).

Russia.—Rough diamond production in Russia was 43.2 million carats during 2018, a slight increase compared with that in 2017, accounting for 29% of total global production. Diamond production in Russia was valued at $3.98 billion, a 3% decrease compared with that in 2017 (Kimberley Process, The, 2018, 2019).

ALROSA officially commissioned and began mining the Verkhne-Munskoe diamond field in Yakutia on October 31, 2018. The Zapolyarnaya, Deimos, Novinka, and Komsomolskaya-Magnitnaya kimberlite pipes were explored during the last quarter of 2018. ALROSA estimated that the deposit would yield 1.8 million carats of rough diamonds per year, and they estimated reserves of the Verkhne-Munskoe diamond field were sufficient to operate for more than 20 years. The development of the Verkhne-Munskoe diamond deposit was ALROSA's largest investment project (PJSC ALROSA, 2018).

South Africa.—Rough diamond production in South Africa was 9.91 million carats during 2018, a slight increase compared with that in 2017, accounting for 7% of total global production. Production in South Africa was valued at $1.23 billion, a 6% decrease compared with that in 2017 (Kimberley Process, The, 2018, 2019).

In July 2018, De Beers proceeded with the responsible closure and rehabilitation of the Voorspoed Mine in Free State Province following an unsuccessful attempt to identify a suitable operator to acquire the mine. De Beers safely closed the mine in December 2018, but the South African Department of Mineral Resources continued looking for an operator capable of purchasing the mine (De Beers Group UK Ltd., 2018a; Petra Diamonds Ltd., undated). De Beers also operated the Venetia Mine in Limpopo Province, where it was conducting a $2 billion project to take the mine underground and extend its operating life into the 2040s (DeBeers Group UK Ltd., 2018a).

Outlook

As domestic and global luxury spending increases, sales of gemstones and jewelry are expected to increase as well. As the gemstone and jewelry industries and their consumers become more comfortable with e-commerce, internet sales of diamonds, gemstones, and jewelry are expected to continue expanding. Internet sales are expected to add to and partially replace "brick-and-mortar" store sales.

Global diamond production is expected to continue declining in terms of quantity as several mines are depleted and closed. The Victor Mine (Canada) is expected to reach its end of life in 2019, the Argyle Mine (Australia) in 2020, the Komsomolskaya Mine (Russia) in 2021, and the Diavik Mine (Canada) in 2025. The Argyle Mine is a large producer of small diamonds, and it is expected to take up to 14 million carats of smaller sized diamonds out of the market when it closes. By 2020, about 25% of diamond production will come from new projects or mine expansions that are currently being developed, but the expected production from these is not likely to be enough to offset the losses from expected mine closures (De Beers Group UK Ltd., 2017, p. 7; 2018b, p. 7; 2019, p. 7).

Synthetic diamonds and other gemstones are likely to continue affecting the natural gemstone industry in unexpected ways. New regulations, increased industry acceptance, and increased consumer acceptance of synthetic gemstones are likely and will have a great effect on the industry. More synthetic gemstones, simulants, and treated gemstones are likely to enter the marketplace and necessitate more transparent industry trade standards to maintain customer confidence.

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TABLE 1
ESTIMATED VALUE OF U.S. NATURAL GEMSTONE PRODUCTION, BY GEM TYPE[1]

(Thousand dollars)

Gem materials	Natural gems		Synthetic gems	
	2017	2018	2017	2018
Beryl	141	162	--	--
Coral, all types	10	10	--	--
Cubic zirconia	XX	XX	12,000	12,000
Diamond	52	39	16,000	25,000
Garnet	34	36	--	--
Gem feldspar	776	451	--	--
Geodes and nodules	54	63	--	--
Moissanite	XX	XX	27,000	27,900
Opal	113	121	--	--
Quartz:				
Macrocrystalline[2]	585	591	--	--
Cryptocrystalline[3]	608	817	--	--
Sapphire and ruby	268	483	--	--
Shell	337	325	--	--
Topaz	10	15	--	--
Tourmaline	245	252	--	--
Turquoise	793	755	75	75
Other	5,200	5,360	--	--
Total	9,230	9,470	55,100	65,000

XX Not applicable. -- Zero.
[1]Table includes data available through April 29, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Macrocrystalline quartz (crystals recognizable with the naked eye) includes amethyst, aventurine, blue quartz, citrine, hawk's eye, prasiolite, prase, quartz, cat's eye, rock crystal, rose quartz, smoky quartz, and tiger's eye.
[3]Cryptocrystalline quartz (microscopically small crystals) includes agate, carnelian, chalcedony, chrysoprase, fossilized wood, heliotrope, jasper, moss agate, onyx, and sard.

TABLE 2
PRICES PER CARAT OF U.S. CUT ROUND DIAMONDS, BY SIZE AND QUALITY IN 2018

Weight (carats)	Color[1]	Clarity[2]	Representative price per carat January[3]	June[4]	December[5]
0.25	G	VS1	$1,650	$1,650	$1,650
Do.	do.	VS2	1,575	1,575	1,575
Do.	do.	SI1	1,250	1,250	1,250
Do.	H	VS1	1,600	1,600	1,600
Do.	do.	VS2	1,500	1,500	1,500
Do.	do.	SI1	1,200	1,200	1,200
0.50	G	VS1	2,600	2,600	2,600
Do.	do.	VS2	2,400	2,400	2,400
Do.	do.	SI1	2,080	2,080	2,080
Do.	H	VS1	2,390	2,390	2,390
Do.	do.	VS2	2,320	2,320	2,320
Do.	do.	SI1	1,910	1,910	1,910
1.00	G	VS1	6,710	6,610	6,610
Do.	do.	VS2	6,200	6,200	6,200
Do.	do.	SI1	5,600	5,550	5,550
Do.	H	VS1	6,080	6,050	6,000
Do.	do.	VS2	5,600	5,600	5,600
Do.	do.	SI1	5,070	5,070	5,070
2.00	G	VS1	12,950	12,720	12,480
Do.	do.	VS2	11,200	11,250	11,310
Do.	do.	SI1	8,400	8,900	9,400
Do.	H	VS1	11,200	11,060	10,920
Do.	do.	VS2	10,000	9,880	9,750
Do.	do.	SI1	9,020	8,870	8,720

Do., do. Ditto.

[1]Gemological Institute of America (GIA) color grades: D—colorless; E—rare white; G, H, I—traces of color.

[2]GIA clarity terms: IF—no blemishes; VVS1—very, very slightly included; VS1—very slightly included; VS2—very slightly included, but not visible; SI1—slightly included.

[3]Source: The Gem Guide, v. 37, no. 1, January/February 2018, p. 26–28.

[4]Source: The Gem Guide, v. 37, no. 4, July/August 2018, p. 26–28.

[5]Source: The Gem Guide, v. 37, no. 6, November/December 2018, p. 26–28.

TABLE 3
PRICES PER CARAT OF U.S. CUT COLORED GEMSTONES IN 2018

Gemstone	Price range per carat January[1]	December[2]
Amethyst	$30–35	$30–35
Aquamarine	325–375	325–375
Citrine	13–22	13–22
Emerald	3,250–4,500	3,250–4,500
Opal, fire	180–250	180–250
Opal, white (also jelly opal)	65–80	65–80
Pearl, cultured saltwater[3]	5	5
Peridot	165–180	165–180
Rhodolite garnet	55–80	65–90
Ruby	2,640–3,600	2,640–3,600
Sapphire, blue	1,080–1,900	950–1,700
Tanzanite	375–395	350–395
Topaz, blue	7–8	7–8
Topaz, yellow	175–250	175–250
Tourmaline, green	135–200	135–200
Tourmaline, pink	170–200	170–200

[1]Source: The Gem Guide, v. 37, no. 1, January/February 2018, p. 54–55, 60, 64, 72–74, 77, 80–83, and 90. These figures are approximate wholesale purchase prices paid by retail jewelers on a per stone basis for 1 to less than 1 carat, fine-quality stones.

[2]Source: The Gem Guide, v. 37, no. 6, November/December 2018, p. 54–55, 60, 64, 72–74, 77, 80–83, and 90. These figures are approximate wholesale purchase prices paid by retail jewelers on a per stone basis for 1 to less than 1 carat, fine-quality stones.

[3]Prices are per 4.5–5-millimeter pearl.

TABLE 4
U.S. EXPORTS AND REEXPORTS OF DIAMOND (EXCLUSIVE OF
INDUSTRIAL DIAMOND), BY COUNTRY OR LOCALITY[1, 2]

Country or locality	2017 Quantity (carats)	2017 Value[3] (thousands)	2018 Quantity (carats)	2018 Value[3] (thousands)
Exports:				
Aruba	1,300	$3,580	1,350	$4,150
Australia	11,500	11,900	73,900	6,630
Belgium	85,700	232,000	14,100	74,800
Brazil	32,800	6,830	33,100	9,720
Canada	42,200 r	77,000	41,500	64,700
Cayman Islands	322	647	3,760	1,420
China	1,410	12,700	1,040	2,270
Denmark	2,410	1,080	1,750	1,180
France	892	17,100	22,400	13,600
Germany	1,540	2,040	1,780	968
Hong Kong	1,420,000	491,000	761,000	182,000
India	561,000	343,000	620,000	412,000
Indonesia	1,070	186	1,930	343
Israel	61,000	253,000	54,800	177,000
Italy	4,350	3,240	24,800	6,390
Japan	13,200	2,820	2,990	1,480
Mexico	609,000	61,000	253,000	114,000
Netherlands	7,530	10,400	124	302
Panama	22,500	1,080	5,550	12,800
Singapore	1,060	13,000	6,680	492
Sint Maarten	3,960 r	12,100 r	5,990	15,700
South Africa	276	3,110	2,160	1,580
Switzerland	22,800	36,300	5,860	25,400
Taiwan	1,100	309	2,150	3,160
Thailand	96,400	20,000	56,500	13,600
United Arab Emirates	97,300	40,100	183,000	11,700
United Kingdom	6,410	13,200	21,900	11,900
Vietnam	14,500	18,800	885	876
Other	8,950 r	15,400 r	12,900	14,200
Total	3,130,000	1,700,000	2,220,000	1,180,000
Reexports:				
Armenia	27,500	5,900	35,300	6,640
Aruba	2,980	6,070	2,400	6,470
Australia	10,600	53,900	5,250	68,000
Austria	137	11,100	309	23,700
Belgium	621,000	2,460,000	691,000	2,900,000
Botswana	1,860	5,030	2,580	8,240
Brazil	24,700	2,690	11,300	2,900
Canada	93,000	125,000	93,100	134,000
China	33,800	44,700	54,200	60,800
Dominican Republic	19,100	6,320	15,400	6,390
France	2,130	121,000	4,290	133,000
Germany	19,400	5,930	18,500	9,000
Hong Kong	2,410,000	2,900,000	2,390,000	3,040,000
India	2,610,000	3,800,000	2,910,000	4,820,000
Indonesia	5	40	8,790	303
Ireland	14,500	10,100	2,870	10,800
Israel	984,000	4,620,000	911,000	4,550,000
Italy	61,900	59,300	60,800	78,600
Japan	40,900	66,900	39,200	56,200
Korea, Republic of	8,450	153	562	77
Laos	7,280	4,080	2,230	1,450
Lebanon	1,470	3,750	2,900	2,570
Malaysia	5,280	1,740	10,400	2,180
Mexico	8,720	11,500	16,200	11,600
Namibia	9,530 r	6,180 r	10,600	8,660
Netherlands	2,320	1,640	342	1,870
Panama	1,070	791	60	477

See footnotes at end of table.

TABLE 4—Continued
U.S. EXPORTS AND REEXPORTS OF DIAMOND (EXCLUSIVE OF INDUSTRIAL DIAMOND), BY COUNTRY OR LOCALITY[1, 2]

	2017		2018	
Country or locality	Quantity (carats)	Value[3] (thousands)	Quantity (carats)	Value[3] (thousands)
Reexports:—Continued				
Russia	76	11,400	4,010	40,700
Singapore	2,780	45,200	23,200	64,900
Sint Maarten	14,300	36,600	16,700	38,300
South Africa	8,360	116,000	15,100	95,900
Switzerland	104,000	1,260,000	111,000	1,270,000
Taiwan	6,290	4,870	25,300	4,160
Thailand	113,000	81,300	134,000	121,000
Ukraine	2,580	766	8,990	2,570
United Arab Emirates	583,000	788,000	596,000	762,000
United Kingdom	55,900	361,000	37,200	357,000
Vietnam	38,700 r	45,100 r	46,100	59,200
Other	12,100 r	12,000 r	9,120	10,700
Total	7,960,000	17,100,000	8,320,000	18,800,000
Grand total	11,100,000	18,800,000	10,500,000	20,000,000

[r]Revised.
[1]Table includes data available through April 29, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Harmonized Tariff Schedule of the United States codes 7102.31.0000, 7102.39.0010, and 7102.39.0050.
[3]Values are free alongside ship.

Source: U.S. Census Bureau.

TABLE 5

U.S. IMPORTS FOR CONSUMPTION OF DIAMOND, BY KIND, WEIGHT, AND COUNTRY OR LOCALITY[1]

	2017		2018	
Kind, weight, and country or locality	Quantity (carats)	Value[2] (thousands)	Quantity (carats)	Value[2] (thousands)
Rough or uncut, natural:[3, 4]				
Angola	19,300	$132,000	12,200	$43,800
Australia	4,170	463	4,430	2,980
Botswana	231,000	629,000	483,000	251,000
Brazil	2,340	13,400	5,510	5,060
Canada	131,000	59,400	156,000	32,200
Congo (Kinshasa)	6,270	991	1,890	1,950
Guyana	3,440	1,540	6,880	1,980
India	21,500	162	20,000	58
Lesotho	510	15,600	2,610	90,600
Namibia	22,500	29,700	45,200	34,700
Russia	23,500	20,200	30,900	40,600
Sierra Leone	2,130	12,600	374	973
South Africa	118,000	143,000	165,000	100,000
Other	712 r	2,510 r	1,430	3,050
Total	587,000	1,060,000	935,000	609,000
Cut but unset, not more than 0.5 carat:[5]				
Armenia	3,130	1,550	2,120	985
Australia	3,550	543	2,340	1,630
Belgium	164,000	84,100	141,000	89,100
Botswana	5,070	10,600	16,000	18,900
Brazil	1,870	542	2,000	1,440
Cambodia	22,800	16,900	29,500	18,900
Canada	8,510	8,150	13,300	11,100
China	58,400	31,000	83,900	38,600
Germany	3,050	1,100	1,160	400
Hong Kong	211,000	40,300	139,000	22,300
India	4,060,000	1,260,000	4,400,000	1,430,000
Israel	742,000	267,000	789,000	295,000
Italy	2,240	805	7,070	1,160
Laos	5,970	6,120	11,100	11,300
Mauritius	21,300	33,200	19,700	32,000
Mexico	13,900	3,740	38,500	4,860
Russia	699	1,330	3,460	6,530
South Africa	4,010	3,810	15,100	11,100
Sri Lanka	6,570	6,360	9,650	8,710
Thailand	16,900	5,910	49,200	7,470
United Arab Emirates	6,740	2,380	2,850	1,690
United Kingdom	20,400	3,640	17,100	3,020
Vietnam	73,900	42,100	57,200	46,600
Other	9,420 r	3,960 r	7,250	4,060
Total	5,460,000	1,840,000	5,860,000	2,070,000
Cut but unset, more than 0.5 carat:[6]				
Angola	75	6,000	1,050	201,000
Armenia	2,850	1,920	6,950	3,360
Australia	3,280	159,000	6,370	65,800
Belgium	385,000	2,930,000	305,000	3,060,000
Botswana	25,500	125,000	28,700	210,000
Brazil	840	36,100	556	26,400
Canada	24,800	88,000	22,700	101,000
China	27,200	178,000	37,000	222,000
Colombia	1,440	6,010	236	337
Congo (Kinshasa)	40	8,620	242	4,400
France	1,880	57,300	1,890	56,400
Germany	560	4,110	364	4,180
Guinea	11,200	16,600	20	45
Hong Kong	51,900	281,000	42,300	149,000
India	2,450,000	7,290,000	2,790,000	8,460,000
Israel	1,320,000	7,170,000	1,410,000	7,600,000
Italy	2,450	23,400	1,660	29,200

See footnotes at end of table.

TABLE 5—Continued

U.S. IMPORTS FOR CONSUMPTION OF DIAMOND, BY KIND, WEIGHT, AND COUNTRY OR LOCALITY[1]

	2017		2018	
Kind, weight, and country or locality	Quantity (carats)	Value[2] (thousands)	Quantity (carats)	Value[2] (thousands)
Cut but unset, more than 0.5 carat:[6]—Continued				
Japan	1,750	4,760	654	2,280
Lesotho	9	328	98	15,300
Mauritius	7,410	24,600	11,400	46,800
Namibia	15,700	57,200	18,600	78,900
Russia	6,920	50,200	51,700	274,000
Singapore	1,290	14,400	134	857
South Africa	39,300	617,000	34,500	1,120,000
Spain	857	16,100	707	6,940
Switzerland	7,060	430,000	6,970	356,000
Thailand	17,800	25,300	24,900	58,800
Ukraine	2,540	2,840	2,440	2,640
United Arab Emirates	5,080	38,200	6,490	106,000
United Kingdom	11,400	134,000	6,430	135,000
Vietnam	4,810	12,600	4,080	16,100
Other	3,550 r	20,400 r	7,200	20,500
Total	4,430,000	19,800,000	4,840,000	22,400,000

[r]Revised.

[1]Table includes data available through April 29, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Customs value.

[3]Includes some natural partially worked or shaped diamond.

[4]Harmonized Tariff Schedule of the United States (HTS) code 7102.31.0000.

[5]HTS code 7102.39.0010.

[6]HTS code 7102.39.0050.

Source: U.S. Census Bureau.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF GEMSTONES, OTHER THAN DIAMOND, BY KIND AND COUNTRY OR LOCALITY[1]

Kind and country or locality	2017 Quantity (carats)	2017 Value[2] (thousands)	2018 Quantity (carats)	2018 Value[2] (thousands)
Emerald:[3]				
Afghanistan	75	$97	14,700	$5,100
Belgium	4,580	4,870	892	2,140
Brazil	132,000	18,000	132,000	19,300
Burma	1,360	140	121	310
Canada	724	93	1,250	331
China	7,470	255	18,000	2,340
Colombia	334,000	209,000	398,000	205,000
France	8,700	60,000	11,200	74,400
Germany	16,700	4,110	39,100	3,350
Hong Kong	424,000	158,000	96,600	30,500
India	1,040,000	131,000	1,740,000	140,000
Israel	223,000	70,600	190,000	102,000
Italy	26,900	20,700	46,100	34,800
Japan	587	79	639	312
Madagascar	36,500	1,070	4	7
Mozambique	4,260	1,590	2,520	194
South Africa	10,300	3,160	22,400	3,260
Sri Lanka	841	1,780	2,370	211
Switzerland	9,480	56,400	9,630	53,100
Tanzania	10	3	3,000	60
Thailand	540,000	20,100	666,000	26,500
United Arab Emirates	8,020	1,150	6,280	3,560
United Kingdom	3,660	30,200	3,360	23,700
Zambia	307,000	37,100	478,000	67,200
Other	565 r	596 r	1,360	2,740
Total	3,140,000	830,000	3,880,000	801,000
Ruby:[4]				
Afghanistan	--	--	5,010	90
Belgium	627	4,350	3,060	1,720
Brazil	3,400	181	3	5
Burma	26,600	8,250	17,600	61,300
Canada	75	132	354	283
China	72,000	1,660	21,000	1,080
France	6,380	26,900	7,180	40,900
Germany	8,640	3,610	38,900	1,570
Hong Kong	440,000	27,800	66,200	18,400
India	1,410,000	24,200	1,340,000	35,800
Israel	10,400	4,700	20,900	3,980
Italy	5,660	12,500	6,230	19,300
Kenya	4,700	159	1,250	23
Madagascar	34,600	5,860	13,200	2,310
Malaysia	12,500	21	--	--
Mauritania	--	--	2,350	50
Mozambique	123,000	46,100	78,700	46,700
Nigeria	1,070	4	1,700	14
South Africa	6,000	3,150	18,700	1,250
Sri Lanka	2,500	1,060	2,060	6,980
Switzerland	2,660	29,100	3,280	34,900
Tanzania	1,540	19,700	5	6
Thailand	2,180,000	130,000	2,330,000	94,400
United Arab Emirates	4,230	4	1,990	5,140
United Kingdom	1,330	5,640	1,320	12,100
Zambia	752	23	2,360	257
Other	1,220 r	1,160 r	2,320	1,310
Total	4,360,000	356,000	3,990,000	390,000

See footnotes at end of table.

TABLE 6—Continued
U.S. IMPORTS FOR CONSUMPTION OF GEMSTONES, OTHER THAN DIAMOND, BY KIND AND COUNTRY OR LOCALITY[1]

Kind and country or locality	2017 Quantity (carats)	2017 Value[2] (thousands)	2018 Quantity (carats)	2018 Value[2] (thousands)
Sapphire:[5]				
Australia	6,100	262	10,600	334
Austria	--	--	1,570	37
Belgium	1,390	2,070	1,690	5,010
Brazil	12,100	559	4,480	61
Burma	17,200	2,920	3,100	8,120
China	81,100	192	78,200	555
Colombia	444	2,650	23	550
France	15,200	47,200	11,100	68,400
Germany	30,100	7,270	84,800	2,520
Gibraltar	10,000	100	--	--
Hong Kong	429,000	73,700	166,000	39,500
India	1,420,000	27,300	1,880,000	52,300
Israel	18,200	15,000	31,600	8,810
Italy	6,580	8,340	16,700	10,200
Japan	2,820	334	68,700	293
Madagascar	113,000	6,240	81,300	8,620
Moldova	3,190	32	186	4
Mozambique	5,710	451	3,460	432
Nigeria	101	50	21,700	411
South Africa	2,180	207	11,000	304
Sri Lanka	426,000	104,000	354,000	86,200
Switzerland	21,200	53,500	20,200	78,000
Taiwan	126	28	3,170	1,490
Thailand	3,810,000	121,000	3,880,000	104,000
United Arab Emirates	1,720	377	2,700	1,190
United Kingdom	5,880	10,300	3,160	8,040
Zambia	2,030	22	21,900	114
Other	3,650 r	2,030 r	5,790	1,460
Total	6,440,000	486,000	6,770,000	487,000
Other precious and semiprecious nondiamond gemstones:				
Rough, uncut, all countries[6]	1,650,000,000 r	34,700 r	1,540,000,000	55,300
Cut, unset, all countries[7]	NA	196,000 r	NA	520,000

[r]Revised. NA Not available. -- Zero.
[1]Table includes data available through April 29, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Customs value.
[3]Harmonized Tariff Schedule of the United States (HTS) code 7103.91.0030.
[4]HTS code 7103.91.0010.
[5]HTS code 7103.91.0020.
[6]HTS codes 7103.10.2000, 7103.10.2080, and 7103.10.4000.
[7]HTS code 7103.99.1000.

Source: U.S. Census Bureau.

TABLE 7
VALUE OF U.S. IMPORTS OF SYNTHETIC
AND IMITATION GEMSTONES, BY COUNTRY OR LOCALITY[1, 2]

(Thousand dollars)

Country or locality	2017	2018
Synthetic, cut but unset[3] and worked, not for jewelry:[4]		
Austria	1,290 r	1,440
Belgium	2,250 r	4,060
China	20,500 r	50,300
Germany	8,810 r	9,650
Hong Kong	23,200 r	71,200
India	78,500 r	101,000
Israel	2,500 r	3,820
Japan	449	709
Russia	10,400 r	8,350
Singapore	36,000	1,050
South Africa	30	407
Sri Lanka	336 r	605
Switzerland	1,100	883
Thailand	1,290 r	939
United Arab Emirates	627	5,470
United Kingdom	323	1,090
Other	6,830 r	2,010
Total	194,000 r	263,000
Imitation:[5]		
Australia	8	284
Austria	26,000	30,000
Canada	18	19
China	22,400 r	21,900
Czechia	2,150	1,550
El Salvador	67	37
Germany	222 r	240
Hong Kong	99 r	141
India	279 r	310
Italy	102 r	97
Japan	161 r	35
Korea, Republic of	284 r	263
Lithuania	46	114
Mexico	19	4
Pakistan	112 r	213
Taiwan	487 r	2,320
Thailand	256 r	92
United Kingdom	15 r	32
Vietnam	--	88
Other	54 r	107
Total	52,700 r	57,800

[r]Revised. -- Zero.
[1]Table includes data available through April 29, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Customs value.
[3]Harmonized Tariff Schedule of the United States (HTS) code 7104.90.1000.
[4]HTS code 7104.90.5000.
[5]HTS codes 3926.90.4000 and 7018.10.2000.

Source: U.S. Census Bureau.

TABLE 8
U.S. IMPORTS FOR CONSUMPTION OF GEMSTONES[1]

(Thousand carats and thousand dollars)

Stones	2017 Quantity	2017 Value[2]	2018 Quantity	2018 Value[2]
Coral and similar materials, unworked[3]	6,930	15,400	6,570	16,900
Diamond:				
Cut but unset[4]	9,890	21,700,000	10,700	24,500,000
Rough or uncut[5]	587	1,060,000	935	609,000
Emerald, cut but unset[6]	3,140	830,000	3,880	801,000
Pearl:				
Cultured[7]	NA	18,300	NA	19,700
Imitation[8]	NA	2,240 r	NA	1,960
Natural[9]	NA	12,900	NA	8,850
Ruby, cut but unset[10]	4,360	356,000	3,990	390,000
Sapphire, cut but unset[11]	6,440	486,000	6,770	487,000
Other precious and semiprecious nondiamond gemstone:				
Rough, uncut[12]	1,400,000 r	33,500 r	1,450,000	54,500
Rough, simply sawn[13]	243,000	1,180	90,900	881
Gemstones, cut but unset[14]	NA	196,000	NA	520,000
Gemstones, worked, not for jewelry[15]	NA	12,000	NA	20,200
Synthetic, cut but unset[16] and worked, not for jewelry[17]	NA	194,000	NA	263,000
Imitation[18]	NA	52,700 r	NA	57,800
Total	1,680,000 r	24,900,000 r	1,570,000	27,700,000

[r]Revised. NA Not available.
[1]Table includes data available through April 29, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Customs value.
[3]Harmonized Tariff Schedule of the United States (HTS) code 0508.00.0000.
[4]HTS codes 7102.39.0010 and 7102.39.0050.
[5]HTS code 7102.31.0000.
[6]HTS code 7103.91.0030.
[7]HTS code 7101.21.0000.
[8]HTS code 7018.10.1000.
[9]HTS codes 7101.10.3000 and 7101.10.6000.
[10]HTS code 7103.91.0010.
[11]HTS code 7103.91.0020.
[12]HTS codes 7103.10.2000 and 7103.10.2080.
[13]HTS code 7103.10.4000.
[14]HTS code 7103.99.1000.
[15]HTS code 7103.99.5000.
[16]HTS code 7104.90.1000.
[17]HTS code 7104.90.5000.
[18]HTS codes 3926.90.4000 and 7018.10.2000.

Source: U.S. Census Bureau.

TABLE 9
GUIDE TO SELECTED GEMSTONES AND GEM MATERIALS USED IN JEWELRY

Name	Composition	Color	Practical size[1]	Cost[2]	Hardness (Mohs)	Specific gravity	Refraction	Refractive index	May be confused with	Recognition characteristics
Amber	Hydrocarbon	Yellow, red, green, blue	Any	Low to medium	2.5–2.0	1.1–1.0	Single	1.54	Synthetic or pressed plastics, kauri gum	Fossil resin, color, low density, soft, insects.
Apatite	Chlorocalcium phosphate	Colorless, pink, yellow, green, blue, violet	Small	Low	5.0	3.23–3.16	Double	1.65–1.63	Amblygonite, andalusite, brazilianite, precious beryl, titanite, topaz, tourmaline	Crystal habit, color, hardness, appearance.
Azurite	Copper carbonate hydroxide	Azure, dark blue, pale blue	Small to medium	do.	4.0–3.5	3.9–3.7	do.	1.85–1.72	Dumortierite, hauynite, lapis lazuli, lazulite, sodalite	Color, softness, crystal habits, associated minerals.
Benitoite	Barium titanium silicate	Blue, purple, pink, colorless	do.	High	6.5–6.0	3.68–3.64	do.	1.80–1.76	Sapphire, tanzanite, blue diamond, blue tourmaline, cordierite	Strong blue in ultraviolet light.
Beryl:										
Aquamarine	Beryllium aluminum silicate	Blue-green to light blue	Any	Medium to high	8.0–7.5	2.80–2.63	do.	1.58	Synthetic spinel, blue topaz	Double refraction, refractive index.
Bixbite	do.	Red	Small	Very high	8.0–7.5	2.80–2.63	do.	1.58	Pressed plastics, tourmaline	Refractive index.
Emerald, natural	do.	Green	Medium	do.	7.5	2.80–2.63	do.	1.58	Fused emerald, glass, tourmaline, peridot, green garnet doublets	Emerald filter, dichroism, refractive index.
Emerald, synthetic	do.	do.	Small	High	8.0–7.5	2.80–2.63	do.	1.58	Genuine emerald	Lack of flaws, brilliant fluorescence in ultraviolet light.
Golden (heliodor)	do.	Yellow to golden	Any	Low to medium	8.0–7.5	2.80–2.63	do.	1.58	Citrine, topaz, glass, doublets	Weak-colored.
Goshenite	do.	Colorless	do.	Low	8.0–7.5	2.80–2.63	do.	1.58	Quartz, glass, white sapphire, white topaz	Refractive index.
Morganite	do.	Pink to rose	do.	do.	8.0–7.5	2.80–2.63	do.	1.58	Kunzite, tourmaline, pink sapphire	Do.
Calcite:										
Marble	Calcium carbonate	White, pink, red, blue, green, or brown	do.	do.	3.0	2.72	Double (strong)	1.66–1.49	Silicates, banded agate, alabaster gypsum	Translucent.
Mexican onyx	do.	do.	do.	do.	3.0	2.72	do.	1.60	do.	Banded, translucent.
Charoite	Hydrated sodium calcium hydroxi-fluoro-silicate	Lilac, violet, or white	Small to medium	do.	6.0–5.0	2.78–2.54	XX	1.56–1.55	Purple marble	Color, locality.
Chrysoberyl:										
Alexandrite	Beryllium aluminate	Green by direct sunlight or incandescent light, red by indirect sunlight or fluorescent light	do.	High	8.5	3.84–3.50	Double	1.75	Synthetic	Strong dichroism, color varies from red to green, hardness.
Cat's eye	do.	Greenish to brownish	Small to large	do.	8.5	3.84–3.50	do.	1.75	Synthetic, shell	Density, translucence, chatoyance.
Chrysolite	do.	Yellow, green, and (or) brown	Medium	Medium	8.5	3.84–3.50	do.	1.75	Tourmaline, peridot	Refractive index, silky.

See footnotes at end of table.

TABLE 9—Continued
GUIDE TO SELECTED GEMSTONES AND GEM MATERIALS USED IN JEWELRY

Name	Composition	Color	Practical size[1]	Cost[2]	Hardness (Mohs)	Specific gravity	Refraction	Refractive index	May be confused with	Recognition characteristics
Chrysocolla	Hydrated copper silicate	Green, blue	Any	Low	4.0–2.0	2.4–2.0	XX	1.57–1.46	Azurite, dyed chalcedony, malachite, turquoise, variscite	Lack of crystals, color, fracture, low density, softness.
Coral	Calcium carbonate	Orange, red, white, black, purple, or green	Branching, medium	do.	4.0–3.5	2.7–2.6	Double	1.66–1.49	False coral	Dull translucent.
Corundum:										
Ruby	Aluminum oxide	Rose to deep purplish red	Small	Very high	9.0	4.10–3.95	do.	1.78	Synthetics, including spinel, garnet	Inclusions, fluorescence.
Sapphire, blue	do.	Blue	Medium	High	9.0	4.10–3.95	do.	1.78	do.	Inclusions, double refraction, dichroism.
Sapphire, fancy	do.	Yellow, pink, colorless, orange, green, or violet	Medium to large	Medium	9.0	4.10–3.95	do.	1.78	Synthetics, glass and doublets, morganite	Inclusions, double refraction, refractive index.
Sapphire or ruby, stars	do.	Red, pink, violet, blue, or gray	do.	High to low	9.0	4.10–3.95	do.	1.78	Star quartz, synthetic stars	Shows asterism, color side view.
Sapphire or ruby, synthetic	do.	Yellow, pink, blue, green, orange, violet, or red	Up to 20 carats	Low	9.0	4.10–3.95	do.	1.78	Synthetic spinel, glass	Curved striae, bubble inclusions.
Cubic zirconia	Zirconium and yttrium oxides	Colorless, pink, blue, lavender, yellow	Small	do.	8.5–8.25	5.8	Single	2.17	Diamond, zircon, titania, moissanite	Hardness, density, lack of flaws and inclusions, refractive index.
Diamond	Carbon	White, blue-white, yellow, brown, green, red, pink, blue	Any	Very high	10.0	3.525–3.516	do.	2.42	Zircon, titania, cubic zirconia, moissanite	High index, dispersion, hardness, luster.
Feldspar:										
Amazonite	Alkali aluminum silicate	Green-blue	Large	Low	6.5–6.0	2.56	XX	1.52	Jade, turquoise	Cleavage, sheen, vitreous to pearly, opaque, grid.
Labradorite	do.	Gray with blue and bronze sheen color play (schiller)	do.	do.	6.5–6.0	2.56	XX	1.56	do.	Do.
Moonstone	do.	Colorless, white, gray, or yellow with white, blue, or bronze schiller	do.	do.	6.5–6.0	2.77	XX	1.54–1.52	Glass, chalcedony, opal	Pale sheen, opalescent.
Sunstone	do.	Orange, red brown, colorless with gold or red glittery schiller	Small to medium	do.	6.5–6.0	2.77	XX	1.55–1.53	Aventurine, glass	Red glittery schiller.
Garnet	Complex silicate	Brown, black, yellow, green, red, or orange	do.	Low to high	7.5–6.5	4.30–3.15	Single strained	1.98–1.79	Synthetics, spinel, glass	Single refraction, anomalous strain.
Hematite	Iron oxide	Black, black-gray, brown-red	Medium to large	Low	6.5–5.5	5.28–5.12	XX	3.22–2.94	Davidite, cassiterite, magnetite, neptunite, pyrolusite, wolframite	Crystal habit, streak, hardness.

See footnotes at end of table.

TABLE 9—Continued
GUIDE TO SELECTED GEMSTONES AND GEM MATERIALS USED IN JEWELRY

Name	Composition	Color	Practical size[1]	Cost[2]	Hardness (Mohs)	Specific gravity	Refraction	Refractive index	May be confused with	Recognition characteristics
Jade:										
Jadeite	Complex silicate	Green, yellow, black, white, or mauve	Large	Low to very high	7.0–6.5	3.5–3.3	Crypto-crystalline	1.68–1.65	Nephrite, chalcedony, onyx, bowenite, vesuvianite, grossularite	Luster, spectrum, translucent to opaque.
Nephrite	Complex hydrous silicate	do.	do.	do.	6.5–6.0	3.10–2.96	do.	1.63–1.61	Jadeite, chalcedony, onyx, bowenite, vesuvianite, grossularite	Do.
Jet (gagate)	Lignite	Deep black, dark brown	do.	Low	4.0–2.5	1.35–1.19	XX	1.68–1.64	Anthracite, asphalt, cannel coal, onyx, schorl, glass, rubber	Luster, color.
Lapis lazuli	Sodium calcium aluminum silicate	Dark azure-blue to bright indigo blue or even a pale sky blue	do.	do.	6.0–5.0	3.0–2.50	XX	1.50	Azurite, dumortierite, dyed howlite, lazulite, sodalite, glass	Color, crystal habit, associated minerals, luster, localities.
Malachite	Hydrated copper carbonate	Light to black-green banded	do.	do.	4.0–3.5	4.10–3.25	XX	1.91–1.66	Brochantite, chrysoprase, opaque green gemstones	Color banding, softness, associated minerals.
Moissanite	Silicon carbide	Colorless and pale shades of green, blue, yellow	Small	Low to medium	9.25	3.21	Double	2.69–2.65	Diamond, zircon, titania, cubic zirconia	Hardness, dispersion, lack of flaws and inclusions, refractive index.
Obsidian	Amorphous, variable (usually felsic)	Black, gray, brown, dark green, white, transparent	Large	Low	5.5–5.0	2.60–2.35	XX	1.55–1.45	Aegirine-augite, gadolinite, gagate, hematite, pyrolusite, wolframite	Color, conchoidal fracture, flow bubbles, softness, lack of crystal faces.
Opal	Hydrated silica	Reddish orange, colors flash in white gray, black, red, or yellow	do.	Low to high	6.5–5.5	2.3–1.9	Single	1.45	Glass, synthetics, triplets, chalcedony	Color play (opalescence).
Peridot	Iron magnesium silicate	Yellow and (or) green	Any	Medium	7.0–6.5	3.37–3.27	Double (strong)	1.69–1.65	Tourmaline, chrysoberyl	Strong double refraction, low dichroism.
Quartz:										
Agate	Silicon dioxide	Any	Large	Low	7.0	2.64–2.58	XX	XX	Glass, plastic, Mexican onyx	Cryptocrystalline, irregularly banded, dendritic inclusions.
Amethyst	do.	Purple	do.	Medium	7.0	2.66–2.65	Double	1.55	Glass, plastic, fluorite	Macrocrystalline, color, refractive index, transparent, hardness.
Aventurine	do.	Green, red-brown, gold-brown, with metallic iridescent reflection	do.	Low	7.0	2.69–2.64	do.	1.55–1.54	Iridescent analcime, aventurine feldspar, emerald, aventurine glass	Macrocrystalline, color, metallic iridescent flake reflections, hardness.
Cairngorm	do.	Smoky orange or yellow	do.	do.	7.0	2.66–2.65	do.	1.55	do.	Macrocrystalline, color, refractive index, transparent, hardness.
Carnelian	do.	Flesh red to brown red	do.	do.	7.0–6.5	2.64–2.58	do.	1.54–1.53	Jasper	Cryptocrystalline, color, hardness.

See footnotes at end of table.

TABLE 9—Continued
GUIDE TO SELECTED GEMSTONES AND GEM MATERIALS USED IN JEWELRY

Name	Composition	Color	Practical size[1]	Cost[2]	Hardness (Mohs)	Specific gravity	Refraction	Refractive index	May be confused with	Recognition characteristics
Quartz:—Continued										
Chalcedony	Silicon dioxide	Bluish, white, gray	Large	Low	7.0–6.5	2.64–2.58	Double	1.54–1.53	Tanzanite	Cryptocrystalline, color, hardness.
Chrysoprase	do.	Green, apple-green	do.	do.	7.0–6.5	2.64–2.58	do.	1.54–1.53	Chrome chalcedony, jade, prase opal, prehnite, smithsonite, variscite, artificially colored green chalcedony	Do.
Citrine	do.	Yellow	do.	do.	7.0	2.66–2.65	do.	1.55	do.	Macrocrystalline, color, refractive index, transparent, hardness.
Jasper	do.	Any, striped, spotted, or sometimes uniform	do.	do.	7.0	2.66–2.58	XX	XX	do.	Cryptocrystalline, opaque, vitreous luster, hardness.
Onyx	do.	Many colors	do.	do.	7.0	2.64–2.58	XX	XX	do.	Cryptocrystalline, uniformly banded, hardness.
Petrified wood	do.	Brown, gray, red, yellow	do.	do.	7.0–6.5	2.91–2.58	Double	1.54	Agate, jasper	Color, hardness, wood grain.
Rock crystal	do.	Colorless	do.	do.	7.0	2.66–2.65	do.	1.55	Topaz, colorless sapphire	Do.
Rose	do.	Pink, rose red	do.	do.	7.0	2.66–2.65	do.	1.55	do.	Macrocrystalline, color, refractive index, transparent, hardness.
Tiger's eye	do.	Golden yellow, brown, red, blue-black	do.	do.	7.0–6.5	2.64–2.58	XX	1.54–1.53	XX	Macrocrystalline, color, hardness, chatoyancy.
Rhodochrosite	Manganese carbonate	Rose-red to yellowish, striped	do.	Low	4.0	3.7–3.45	Double	1.82–1.6	Fire opal, rhodonite, tugtupite, tourmaline	Color, crystal habit, reaction to acid, perfect rhombohedral cleavage.
Rhodonite	Manganese iron calcium silicate	Dark red, flesh red, with dendritic inclusions of black manganese oxide	do.	do.	6.5–5.5	3.74–3.40	do.	1.75–1.72	Rhodochrosite, thulite, hessonite, spinel, pyroxmangite, spessartine, tourmaline	Color, black inclusions, lack of reaction to acid, hardness.
Shell:										
Mother-of-pearl	Calcium carbonate	White, cream, green, blue-green, with iridescent play of color	Small	do.	3.5	2.85–2.6	XX	XX	Glass and plastic imitation	Luster, iridescent play of color.
Pearl	do.	White, cream to black, sometimes with hint of pink, green, purple	do.	Low to high	4.5–2.5	2.85–2.6	XX	XX	Cultured and glass or plastic imitation	Luster, iridescence, x-ray of internal structure.
Spinel, natural	Magnesium aluminum oxide	Any	Small to medium	Medium	8.0	3.7–3.5	Single	1.72	Synthetic, garnet	Refractive index, single refraction, inclusions.
Spinel, synthetic	do.	do.	Up to 40 carats	Low	8.0	3.7–3.5	Double	1.73	Spinel, corundum, beryl, topaz, alexandrite	Weak double refraction, curved striae, bubbles.

See footnotes at end of table.

TABLE 9—Continued

GUIDE TO SELECTED GEMSTONES AND GEM MATERIALS USED IN JEWELRY

Name	Composition	Color	Practical size[1]	Cost[2]	Hardness (Mohs)	Specific gravity	Refraction	Refractive index	May be confused with	Recognition characteristics
Spodumene:										
Hiddenite	Lithium aluminum silicate	Yellow to green	Medium	Medium	7.0–6.5	3.20–3.13	Double	1.66	Synthetic spinel	Refractive index, color, pleochroism.
Kunzite	do.	Pink to lilac	do.	do.	7.0–6.5	3.20–3.13	do.	1.66	Amethyst, morganite	Do.
Tanzanite	Complex silicate	Blue to lavender	Small	High	7.0–6.0	3.30	do.	1.69	Sapphire, synthetics	Strong trichroism, color.
Topaz	do.	White, blue, green, pink, yellow, gold	Medium	Low to medium	8.0	3.6–3.4	do.	1.62	Beryl, quartz	Color, density, hardness, refractive index, perfect in basal cleavage.
Tourmaline	do.	Any, including mixed	do.	do.	7.5–7.0	3.20–2.98	do.	1.63	Peridot, beryl, garnet corundum, glass	Double refraction, color, refractive index.
Turquoise	Copper aluminum phosphate	Blue to green with black, brown-red inclusions	Large	Low	6.0	2.83–2.60	do.	1.63	Chrysocolla, dyed howlite, dumortierite, glass, plastics, variscite	Difficult if matrix not present, matrix usually limonitic.
Unakite	Granitic rock, feldspar, epidote, quartz	Olive green, pink, and blue-gray	do.	do.	7.0–6.0	3.20–2.60	XX	XX	XX	Olive green, pink, gray-blue colors.
Zircon	Zirconium silicate	White, blue, brown, yellow, or green	Small to medium	Low to medium	7.5–6.0	4.8–4.0	Double (strong)	1.98–1.79	Diamond, synthetics, topaz, aquamarine	Double refraction, strongly dichroic, wear on facet edges.

Do., do. Ditto. XX Not applicable.

[1]Small, up to 5 carats; medium, greater than 5 to less than 50 carats.

[2]Low, up to $25 per carat; medium, greater than $25 to less than $200 per carat.

TABLE 10

LABORATORY-CREATED GEMSTONE PRODUCTION METHODS[1]

Gemstone	Production method	Company or producer	Date of first production
Alexandrite	Flux	Creative Crystals Inc.	1970s.
Do.	Melt pulling	J.O. Crystal Co., Inc.	1990s.
Do.	do.	Kyocera Corp.	1980s.
Do.	Zone melt	Seiko Corp.	Do.
Cubic zirconia	Skull melt	Various producers	1970s.
Diamond	HPHT[2]	General Electric Co.	1950s.
Do.	CVD[3]	Apollo Diamond Inc.	2000s.
Do.	MPCVD[4]	CIW & UA[5]	Do.
Emerald	Flux	Chatham Created Gems, Inc.	1930s.
Do.	do.	Gilson	1960s.
Do.	do.	Kyocera Corp.	1970s.
Do.	do.	Lennix	1980s.
Do.	do.	Government of Russia	Do.
Do.	do.	Seiko Corp.	Do.
Do.	Hydrothermal	Biron Corp.	Do.
Do.	do.	Lechleitner	1960s.
Do.	do.	Regency	1980s.
Do.	do.	Government of Russia	Do.
Moissanite	Sublimation	Cree Research	1980s.
Ruby	Flux	Chatham Created Gems, Inc.	1950s.
Do.	do.	Douras	1990s.
Do.	do.	J.O. Crystal Co., Inc.	1980s.
Do.	do.	Kashan Created Ruby	1960s.
Do.	Melt pulling	Kyocera Corp.	1970s.
Do.	Verneuil	Various producers	1900s.
Do.	Zone melt	Seiko Corp.	1980s.
Sapphire	Flux	Chatham Created Gems, Inc.	1970s.
Do.	Melt pulling	Kyocera Corp.	1980s.
Do.	Verneuil	Various producers	1900s.
Do.	Zone melt	Seiko Corp.	1980s.
Star ruby	Melt pulling	Kyocera Corp.	Do.
Do.	do.	Nakazumi Earth Crystals Co.	Do.
Do.	Verneuil	Linde Air Products Co.	1940s.
Star sapphire	do.	do.	Do.

Do., do. Ditto.

[1]Gemstones that are also synthesized but for which production methods are proprietary include gems such as azurite, garnet, malachite, opal, and turquoise. Gemstone amethyst, citrine, and other quartz minerals are produced by the hydrothermal method.

[2]High-pressure, high-temperature (HPHT).

[3]Chemical vapor deposition (CVD).

[4]Microwave plasma chemical vapor deposition (MPCVD).

[5]The Carnegie Institution of Washington Geophysical Laboratory and the University of Alabama.

TABLE 11

DIAMOND (NATURAL): WORLD PRODUCTION, BY COUNTRY OR LOCALITY AND TYPE[1]

(Thousand carats)

Country or locality and type[2]	2014	2015	2016	2017	2018
Gemstones:					
Angola[3]	7,910	8,110 r	8,120 r	8,490 r	7,570
Australia[e, 4]	186	271	279	343	281
Botswana[e, 5]	17,300	14,500	14,400 r	16,100 r	17,100
Brazil, unspecified[6]	71	32	184	255	251
Cameroon, unspecified[7]	4	2	1	2	2
Canada, unspecified	12,012	11,677	13,036	23,234	23,194
Central African Republic[8]	--	--	9 e	38 e	11 e
China, unspecified	150 e	150 e	127 e	230 r	99
Congo (Brazzaville)	53	40	12	47	48
Congo (Kinshasa)[e, 9]	3,030 r	3,190 r	3,160 r	3,800 r	3,030
Côte d'Ivoire, unspecified	1	15	20	7	6
Ghana, unspecified	242	174	142	82	54
Guinea[e, 8]	131	134	90	145	234
Guyana, unspecified	100	118	140	52	62
India[10]	10 e	9 e	9	11	11 e
Lesotho, unspecified	346	304	342	1,126	1,294
Liberia[11]	39	41	38	43 r, e	48 e
Namibia, unspecified	1,918	2,053	1,718	1,948	2,397
Russia[e, 12]	21,500	23,500	22,600	23,900 r	24,200
Sierra Leone[e, 8]	496	400	439	231	593
South Africa[e, 13, 14]	3,220 r	3,290 r	3,320 r	3,880 r	3,960
Tanzania[e, 15]	215	184 r	205	259 r	328
Togo, unspecified	(16)	--	--	(16)	--
Zimbabwe[e, 17]	477	349	210	251	326
Total	69,400 r	68,500 r	68,600 r	84,500 r	85,100
Industrial:					
Angola[e, 3]	879	902	902	944 r	841
Australia[e, 4]	9,100	13,300	13,700	16,800	13,800
Botswana[e, 5]	7,400	6,320 r	6,150 r	6,890 r	7,310
Central African Republic[8]	--	--	2 e	10 e	3 e
Congo (Kinshasa)[e, 9]	11,900 r	12,600 r	12,400 r	15,300 r	12,100
Guinea[e, 8]	33	33	23	36	59
India[e, 10]	27	25 r	24	30	29
Indonesia	7	--	--	--	--
Liberia[11]	26	27	25	29 r, e	32 e
Russia[e, 12]	16,900	18,400	17,700	18,800	19,000
Sierra Leone[e, 8]	124	100	110	58	148
South Africa[e, 13, 14]	4,840 r	4,940 r	4,980 r	5,820 r	5,950
Tanzania[e, 15]	38	33 r	36 r	46 r	58
Zimbabwe[17]	4,290 e	3,140 e	1,890 e	2,260 e	2,930
Total	55,600 r	59,800 r	57,900 r	67,000 r	62,200
Grand total	125,000 r	128,000 r	127,000	151,000	147,000

See footnotes at end of table.

[e]Estimated. [r]Revised. -- Zero.
[1]Table includes data available through October 11, 2019. All data are reported unless otherwise noted. Grand totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.
[2]In addition to the countries and (or) localities listed, Belarus, Germany, Ireland, the Republic of Korea, Nigeria, and Sweden may have produced natural diamond, but available information was inadequate to make reliable estimates of output.
[3]Approximately 90% gem quality and 10% industrial quality.
[4]Approximately 2% gem quality and 98% industrial quality.
[5]Approximately 70% gem and near-gem quality and 30% industrial quality.
[6]Private sector and artisanal mining. Includes near-gem and cheap-gem qualities.
[7]Artisanal mining.
[8]Approximately 80% gem quality and 20% industrial quality.
[9]Approximately 20% gem quality and 80% industrial quality; the majority of production is artisanal mining.
[10]Approximately 27% gem quality and 73% industrial quality.
[11]Approximately 60% gem quality and 40% industrial quality.
[12]Approximately 56% gem quality and 44% industrial quality.
[13]Includes artisanal mining.
[14]Approximately 40% gem quality and 60% industrial quality.
[15]Approximately 85% gem quality and 15% industrial quality.
[16]Less than ½ unit.
[17]Approximately 10% gem quality and 90% industrial quality.