Marathonite $Pd_{25}Ge_9$

Crystal Data: Hexagonal. *Point Group*: 3. As angular to rounded, elongated grains to 48 μm.

Physical Properties: *Cleavage*: None. *Tenacity*: Brittle. *Fracture*: Splintery. Hardness = n.d. D(meas.) = n.d. D(calc.) = 10.933

Optical Properties: Opaque. *Color*: White in reflected light. *Streak*: n.d. *Luster*: Metallic. *Optical Class*: Very weak to indiscernible anisotropism. No pleochroism or bireflectance. R: (470) 40.8, (546) 44.1, (589) 45.3, (650) 47.4

Cell Data: *Space Group*: *P*3. a = 7.391(1) c = 10.477(2) Z = 1

X-Ray Diffraction Pattern: Marathon Cu-PGE deposit, Coldwell complex, Ontario, Canada. 2.148 (100), 2.374 (29), 1.2395 (14), 1.3605 (13), 2.748 (10), 2.436 (10), 1.759 (10)

Chemistry:

	(1)	(2)
Si	0.11	
S	0.39	
Cu	2.32	
Ge	18.46	19.73
Pd	77.83	80.27
Pt	1.10	.
Total	100.22	100.00

(1) Marathon Cu-PGE deposit, Coldwell complex, Ontario, Canada; average EDS analysis supplemented by Raman spectroscopy; corresponding to $(Pd_{23.82}Cu_{1.19}Pt_{0.18})_{\Sigma=25.19}(Ge_{8.28}S_{0.40}Si_{0.13})_{\Sigma=8.81}$. (2) $Pd_{25}Ge_9$.

Occurrence: In heavy mineral separates from olivine gabbro.

Association: Vysotskite, Au-Ag alloy, isoferroplatinum, Ge-bearing keithconnite, majakite, coldwellite, ferhodsite-series minerals (cuprorhodsite-ferhodsite), kotulskite, mertieite-II, chalcopyrite, bornite, millerite, Rh-bearing pentlandite, oberthürite, torryweiserite, a clinoamphibole, an Fe-rich chlorite-group mineral.

Distribution From the W horizon, Marathon Cu-PGE deposit, Coldwell complex, Ontario, Canada.

Name: For *Marathon*, Ontario, Canada, after which the Marathon Cu-PGE deposit (Coldwell complex) is named.

Type Material: Canadian Museum of Nature, Gatineau, Québec (87180).

References: (1) McDonald, A.M., D.E. Ames, I.M. Kjarsgaard, L.J. Cabri, W. Zhe, K.C. Ross, and D.J. Good (2021) Marathonite, $Pd_{25}Ge_9$, and palladogermanide, Pd_2Ge, two new platinum-group minerals from the Marathon deposit, Coldwell Complex, Ontario, Canada: Descriptions, crystal-chemical considerations, and genetic implications. Can. Mineral., 59, 1865-1886.