Paděraite $Cu_7[(Cu, Ag)_{0.33}Pb_{1.33}Bi_{11.33}]S_{22}$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. Platy fragments, in granular to parallel fibrous aggregates, to several mm.

Physical Properties: *Fracture*: Uneven. Hardness = n.d. D(meas.) = n.d. D(calc.) = 6.69-6.91

Optical Properties: Opaque. *Color*: Steel-gray on fresh fractures, turning brown to black; in polished section, creamy white. *Anisotropism*: Moderate.

Cell Data: *Space Group*: $P2_1/m$. a = 17.573(2) b = 3.9426(4) c = 28.423(3) β = 105.525(2)° Z = 2
(silver free) $Cu_{7.30}Pb_{1.34}Bi_{11.35}Sb_{0.03}S_{21.97}$
a = 17.585(4) b = 3.9386(9) c = 28.453(7) β = 105.41(1)° Z = 2
(0.51 wt% Ag) $Cu_{7.09}Ag_{0.18}Pb_{1.37}Bi_{11.28}Sb_{0.03}S_{21.98}Te_{0.07}$

X-ray Powder Pattern: Calculated from structure.
3.06 (100), 3.63 (74), 3.21 (61), 2.85 (43), 2.66 (38), 3.18 (34), 2.19 (30)

Chemistry:	(1)	(2)	(3)	(4)
Ag	3.26	1.00		2.76
Pb	6.71	6.47	7.24	10.60
Cu	9.45	11.74	12.08	9.76
Cd		0.01		
Bi	61.40	61.24	61.71	58.83
S	18.90	18.35	18.33	18.05
Total	99.72	98.81	99.46	100.00

(1) Băiţa, Romania; by electron microprobe, average of six analyses; corresponds to $Cu_{5.55}Ag_{1.13}Pb_{1.21}Bi_{10.97}S_{22.00}$. (2) Ocna de Fier, Romania; by electron microprobe, average of 37 analyses; corresponds to $Ag_{0.36}Pb_{1.20}Cu_{7.11}Bi_{11.28}S_{22.05}$. (3) Swartberg, northern Cape Province, South Africa; by electron microprobe, average of six analyses; corresponds to $Cu_{7.30}Pb_{1.34}Bi_{11.35}Sb_{0.03}S_{21.97}$. (4) $AgPb_2Cu_6Bi_{11}S_{22}$.

Occurrence: Intimately intergrown with other Pb-Bi sulfosalts, particularly, members of the cuprobismutite series and the bismuthinite-aikinite homologous series.

Association: Hammarite, pekoite, bismuthinite, cuprobismutite, hodrushite, chalcopyrite, grossular, andradite.

Distribution: In Romania, from Băiţa (Rézbánya) [TL], and in the Paulus mine, Ocna de Fier (Morávicza, Vaskő). At Banská Stiavnica (Schemnitz), Slovakia. From Swartberg, northern Cape Province, South Africa.

Name: Honors Dr. Karel Paděra (b. 1923), Czech mineralogist, Charles University, Prague, Czech Republic, who first worked on the mineral.

Type Material: Charles University, Prague, Czech Republic, 11329; National Museum of Natural History, Washington, D.C., USA, 164244.

References: (1) Mumme, W.G. and L. Žák (1985) Paděraite, $Cu_{5.9}Ag_{1.3}Pb_{1.6}Bi_{11.2}S_{22}$, a new mineral of the cuprobismutite-hodrushite group. Neues Jahrb. Mineral., Monatsh., 557-567. (2) Mumme, W.G. (1986) The crystal structure of paděraite, a mineral of the cuprobismutite series. Can. Mineral., 24, 513-521. (3) Topa, E. and D. Makovicky (2006) The crystal structure of paděraite, $Cu_7(X_{0.33}Pb_{1.33}Bi_{11.33})_{\Sigma 13}S_{22}$, with X = Cu or Ag: new data and interpretation. Can. Mineral., 44, 481-495. (4) (2006) Amer. Mineral., 91(11), 1953 (abs. ref. 3). (5) Cook, N.J. and C.L. Ciobanu (2003) Lamellar minerals of the cuprobismutite series and related paděraite: a new occurrence and implications. Can. Mineral., 41, 441-456.