Reniérite $(Cu, Zn)_{11}Fe_4(Ge, As)_2S_{16}$

Crystal Data: Tetragonal, pseudocubic. *Point Group:* $\bar{4}2m$. As rare equant crystals, to 3 mm; disseminated granular aggregates, irregular patches, and as regular lamellae replacing germanite grains. *Twinning:* Polysynthetic.

Physical Properties: Hardness = 3.5 VHN = 340–363, 351 average (25 g load). D(meas.) = 4.38 D(calc.) = 4.40 Magnetic.

Optical Properties: Opaque. *Color:* Bronze; in polished section, orange-brown. *Luster:* Metallic. *Pleochroism:* Orange to brown or bronze with violet tint. *Anisotropism:* Strong, yellow to reddish orange.
R_1–R_2: (400) 19.6–20.3, (420) 19.1–19.8, (440) 18.7–19.3, (460) 18.7–19.0, (480) 19.8–19.4, (500) 21.9–20.8, (520) 24.5–23.0, (540) 27.1–25.3, (560) 29.6–27.5, (580) 31.2–29.4, (600) 32.6–30.9, (620) 33.8–32.1, (640) 34.7–33.1, (660) 35.3–33.7, (680) 35.6–34.2, (700) 36.0–34.6

Cell Data: *Space Group:* $P\bar{4}2c$. $a = 10.6226(5)$ $c = 10.5506(8)$ $Z = 2$

X-ray Powder Pattern: Kipushi, Congo.
3.06 (100), 1.87 (80), 1.595 (60), 2.65 (30), 1.214 (30), 4.31 (20), 1.083 (20)

Chemistry:

	(1)	(2)		(1)	(2)
Cu	41.63	41.6	Ge	7.75	7.3
Fe	13.73	13.0	Ga		0.5
Zn	3.53	2.7	As	0.87	2.0
Pb	trace		S	31.51	32.6
			Total	99.02	99.7

(1) Kipushi, Congo; corresponds to $(Cu_{10.67}Zn_{0.88})_{\Sigma=11.55}Fe_{4.00}(Ge_{1.74}As_{0.19})_{\Sigma=1.93}S_{16.00}$.
(2) Tsumeb, Namibia; by electron microprobe, corresponds to $(Cu_{10.30}Zn_{0.65})_{\Sigma=10.95}$ $Fe_{3.66}(Ge_{1.58}As_{0.42}Ga_{0.11})_{\Sigma=2.11}S_{16.00}$.

Occurrence: Rare in some Ge-bearing hydrothermal polymetallic deposits.

Association: Germanite, tennantite, enargite, digenite, bornite, chalcopyrite, sphalerite.

Distribution: From the Prince-Léopold mine, Kipushi, 28 km southwest of Lubumbashi, Katanga Province, Congo (Shaba Province, Zaire) [TL]. At M'Passa, 150 km west of Brazzaville, Niari Province, Congo Republic. From Tsumeb, Namibia. At Kabwe (Broken Hill), Zambia. In Bulgaria, in the Chelopech deposit, Sofia, and at the Radka deposit, Pazardzhik. From Akhtala, Armenia. At the San Giovanni mine, Iglesiente, Sardinia, Italy. In the Repparfjord copper deposit, Finnmark, Norway. At Vaygach, Arkhangel'sk; the Urup deposit, Caucasus Mountains, and other less-well-defined localities in Russia. In Japan, at the Shakanai and Furutobe mines, Akita Prefecture. From the Rajpura-Dariba polymetallic deposit, Udaipur district, Rajasthan, India. In the Ruby Creek deposit, southern Brooks Range, Alaska; and at the Inexco #1 mine, Jamestown, Boulder Co., Colorado, USA. From Pinar del Rio, Cuba.

Name: For Armand Marie Vincent Joseph Reniér (1876–1951), Belgian geologist and Director of the Belgian Geological Survey.

Type Material: National School of Mines, Paris, France.

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