Novákite $(Cu, Ag)_{21}As_{10}$

Crystal Data: Monoclinic, pseudotetragonal. *Point Group:* 2, m, or $2/m$. As irregular aggregates, with grains to 3 cm, and as veinlets in arsenic; botryoidal.

Physical Properties: Hardness = 3–3.5 VHN = n.d. D(meas.) = n.d. D(calc.) = 8.01

Optical Properties: Opaque. *Color:* Steel-gray on fresh surface, tarnishes iridescent and then black; white with pale cream tint in reflected light. *Streak:* Black. *Luster:* Metallic. *Anisotropism:* Medium, dark blue-gray and pale brown-ocher.
R_1–R_2: (400) 43.6–49.0, (420) 45.4–50.5, (440) 47.2–52.0, (460) 48.3–53.0, (480) 49.1–53.9, (500) 49.8–54.6, (520) 50.2–55.2, (540) 50.6–55.6, (560) 50.9–56.0, (580) 51.2–56.3, (600) 51.3–56.6, (620) 51.4–56.8, (640) 51.5–56.9, (660) 51.5–57.0, (680) 51.5–57.1, (700) 51.5–57.2

Cell Data: *Space Group:* $C2$, Cm, or $C2/m$. $a = 16.269(3)$ $b = 11.711(2)$ $c = 10.007(2)$ $\beta = 112.74°$ Z = 4

X-ray Powder Pattern: Černý Důl mine, Czech Republic.
1.877 (10), 1.959 (9), 1.180 (9), 1.998 (8), 1.351 (6), 1.225 (6), 6.41 (5)

Chemistry:

	(1)
Cu	60.30
Ag	4.33
As	35.30
Total	99.93

(1) Černý Důl mine, Czech Republic; by electron microprobe, average of 10 analyses; corresponds to $(Cu_{20.14}Ag_{0.85})_{\Sigma=20.99}As_{10.00}$.

Occurrence: In hydrothermal carbonate veins up to 20 cm thick, cutting diopside hornfels lenses in pyroxene gneiss and less commonly in mica schist (Černý Důl mine, Czech Republic).

Association: Arsenic, arsenolamprite, koutekite, silver, löllingite, chalcocite, skutterudite, chalcopyrite, bornite, uraninite, calcite (Černý Důl mine, Czech Republic); algodonite, koutekeite, djurleite, domeykite (Cashin mine, Montrose Co., Colorado, USA).

Distribution: From the Černý Důl mine, Krkonoše (Giant Mountains), Czech Republic [TL]. In the Cashin mine, Montrose Co., Colorado, USA.

Name: In honor of Jiří Novák (1902–1971), Professor of Mineralogy, Charles University, Prague, Czech Republic.

Type Material: National School of Mines, Paris, France; National Museum of Natural History, Washington, D.C., USA, 116992.

References: (1) Johan, Z. and J. Hak (1961) Novákite, $(Cu, Ag)_4As_3$, a new mineral. Amer. Mineral., 46, 885–891. (2) Johan, Z. (1985) The Černy Důl deposit (Czechoslovakia): an example of Ni-, Fe-, Ag-, Cu-arsenide mineralization with extremely high activity of arsenic; new data on paxite, novakite and kutinaite. Tschermaks Mineral. Petrog. Mitt., 34, 167–182.