Diadochite $Fe_2^{3+}(PO_4)(SO_4)(OH)\cdot 5H_2O$

Crystal Data: Triclinic; may be amorphous. *Point Group:* 1 or $\overline{1}$. Rarely microcrystalline, as six-sided platy crystals, in nodular, reniform, botryoidal, stalactitic, colloform aggregates; commonly amorphous, glassy, earthy.

Physical Properties: *Fracture:* Earthy to uneven, conchoidal. *Tenacity:* Pulverulent to brittle. Hardness = 3–4 or less. D(meas.) = 2.0–2.4 D(calc.) = [2.32]

Optical Properties: Semitransparent. *Color:* Yellow, brownish yellow, brown; reddish brown, greenish yellow, pale green, pale yellow; in transmitted light, pale yellow to yellowish brown. *Optical Class:* Biaxial (+), isotropic when glassy. *Dispersion:* $r > v$, strong. n = 1.60–1.61 [isotropic] $\alpha = 1.615$ β = 1.618–1.638 γ = 1.665–1.670 2V(meas.) = Small.

Cell Data: *Space Group:* $P1$ or $P\overline{1}$. a = 9.585(1) b = 10.235(1) c = 7.335(1) $\alpha = 81°46(1)'$ $\beta = 107°57(1)'$ $\gamma = 121°10(1)'$ Z = 2

X-ray Powder Pattern: Haut-le-Wastia, Belgium; commonly X-ray amorphous.
8.74 (100), 4.377 (100), 8.28 (90), 3.929 (85), 4.082 (65), 2.942 (65) 2.918 (40)

Chemistry:

	(1)	(2)	(3)
SO_3	15.14	17.21	19.53
P_2O_5	14.82	16.83	17.32
Fe_2O_3	39.69	37.80	38.97
FeO		0.07	
$H_2O(+)$		16.76	
$H_2O(-)$		10.04	
H_2O	30.35		24.18
rem.		0.86	
Total	100.00	99.57	100.00

(1) Arnsbach, Germany. (2) Haut-le-Wastia, Belgium; H_2O by the Penfield method.
(3) $Fe_2(PO_4)(SO_4)(OH)\cdot 5H_2O$.

Occurrence: A secondary mineral in gossans and some coal deposits, formed by sulfate-rich solutions acting on earlier phosphates, may be post-mine; in cave deposits, the phosphate derived from guano; widespread in secondary phosphate assemblages in granite pegmatites.

Association: Delvauxite, vashegyite, pitticite, melanterite, vivianite, wavellite, leucophosphite, phosphosiderite, ferrostrunzite, beraunite, mitridatite, rockbridgeite, jahnsite, roscherite, "limonite".

Distribution: From Arnsbach, near Gräfenthal, and in the Garnsdorf mine and the Feengrotten (Cave), Saalfeld, Thuringia, Germany. At Visé, Védrin, and Haut-le-Wastia, Belgium. From Hředl, Nučic, Litošice, Vysocany, and Chvaletice, Czech Republic. At Peychagnard, Isère, France. In Slovakia, from Železník (Vashegy). At Leoben, Austria. In the USA, from near Bethel Church, Pike Co., Indiana; at a coal mine in Jackson Township, Coshocton Co., and in Monday Creek Township, Perry Co., Ohio; from the Coon Creek mine, near Shady, Polk Co., Arkansas; in the Tip Top mine, 8.5 km southwest of Custer, Custer Co., South Dakota; from Gringo Gulch, Santa Cruz Co., Arizona. At Rapid Creek, Yukon Territory, Canada. A few additional localities are reported.

Name: From the Greek for *a successor*, as it typically is formed from earlier phosphates.

Type Material: Mining Academy, Freiberg, Germany, 20765.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 1011–1013. (2) Van Tassel, R. (1985) Mineraux phosphates secondaires (vashegyite, destinezite [= diadochite], wavellite, crandallite, phosphate de fer) a Haut-le-Wastia, province de Namur (Belgique). Bull. Soc. Belge Géol., 94, 19–27 (in French with English abs.).