## Coskrenite-(Ce) $(Ce, Nd, La)_2(SO_4)_2(C_2O_4)\cdot 8H_2O$



**Crystal Data:** Triclinic. *Point Group:* $\overline{1}$. Crystals are wedge-shaped tabular, to 1 mm, flattened on {100}, with {010} and {001}, typically in aggregates.

**Physical Properties:** *Cleavage:* On {001}, perfect. *Tenacity:* Brittle. Hardness = n.d. D(meas.) = n.d. D(calc.) = 2.881 Soluble in $H_2O$.

**Optical Properties:** Transparent. *Color:* Very pale pink under incandescent light, pale blue under fluorescent room light; may be cream-white. *Streak:* White. *Luster:* Vitreous. *Optical Class:* Biaxial (–). *Orientation:* $Z' \wedge c = 21°$ in {001}. *Dispersion:* $r > v$, medium. $\alpha = 1.544(4)$ $\beta = 1.578(4)$ $\gamma = 1.602(4)$ 2V(meas.) = 65(10)° 2V(calc.) = 69(3)°

**Cell Data:** *Space Group:* $P\overline{1}$. $a = 6.007(1)$ $b = 8.368(2)$ $c = 9.189(2)$ $\alpha = 99.90(2)°$ $\beta = 105.55(2)°$ $\gamma = 107.71(2)°$ Z = 1

**X-ray Powder Pattern:** Alum Cave Bluff, Tennessee, USA.
5.48 (100), 8.52 (70), 6.72 (60), 3.84 (60), 4.26 (50), 3.35 (40), 2.744 (40)

**Chemistry:**

| | (1) | | (1) |
|---|---|---|---|
| $SO_3$ | 22.6 | $Sm_2O_3$ | 1.0 |
| $C_2O_3$ | [10.2] | $Eu_2O_3$ | 0.8 |
| $Y_2O_3$ | 0.1 | $Gd_2O_3$ | 0.3 |
| $La_2O_3$ | 4.6 | F | 0.3 |
| $Ce_2O_3$ | 25.9 | $H_2O$ | [20.4] |
| $Pr_2O_3$ | 2.1 | $-O = F_2$ | [0.1] |
| $Nd_2O_3$ | 13.3 | Total | [101.5] |

(1) Alum Cave Bluff, Tennessee, USA; by electron microprobe, $C_2O_3$ and $H_2O$ calculated from stoichiometry, original total given as 100.0%; corresponding to $(Ce_{1.06}Nd_{0.56}La_{0.20}Pr_{0.09}Sm_{0.04}Eu_{0.03}Gd_{0.01}Y_{0.01})_{\Sigma=2.00}(SO_4)_2(C_2O_4)\cdot 8H_2O$.

**Occurrence:** Formed by weathering of pyritiferous phyllite with evaporation of the resulting sulfate-rich solutions in soil, the rare earths probably derived from monazite and xenotime.

**Association:** Epsomite, apjohnite.

**Distribution:** From Alum Cave Bluff, Great Smoky Mountains National Park, Tennessee, USA.

**Name:** Honors Dr. T. Dennis Coskren (1942– ), geologist and geochemist, Columbia, Maryland, USA, who studied the minerals of Alum Cave Bluff, Tennessee, USA.

**Type Material:** University of Michigan, Ann Arbor, Michigan; National Museum of Natural History, Washington, D.C., USA.

**References:** (1) Peacor, D.R., R.C. Rouse, and E.J. Essene (1999) Coskrenite-(Ce), $(Ce, Nd, La)_2(SO_4)_2(C_2O_4)\cdot 8H_2O$, a new rare-earth oxalate mineral from Alum Cave Bluff, Tennessee: characterization and crystal structure. Can. Mineral., 37, 1453–1462. (2) (2000) Amer. Mineral., 85, 1561 (abs. ref. 1).