

**Crystal Data:** Hexagonal. *Point Group:* 6/m 2/m 2/m. Crystals tabular, crudely hexagonal, to 0.7 mm; irregular grains to 600 μm (meteorites).

**Physical Properties:** *Cleavage:* Perfect on {0001}. *Fracture:* n.d. *Tenacity:* n.d. *Hardness* = 6 D(meas.) = n.d. D(calc.) = 2.747

**Optical Properties:** Transparent. *Color:* Colorless. *Streak:* n.d. *Luster:* n.d. *Optical Class:* Uniaxial (+).  $\omega = 1.575$   $\varepsilon = 1.580$

**Cell Data:** *Space Group:* P6<sub>3</sub>/mcm.  $a = 5.122(5)$   $c = 14.781(5)$   $Z = 2$

**X-ray Powder Pattern:** Chelyabinsk coal basin, Russia.  
3.73 (100), 2.57 (80), 2.85 (70), 1.847 (70), 4.48 (60), 3.83 (60)

<b>Chemistry:</b>	(1)	(2)	(3)
SiO <sub>2</sub>	42.6	38.18	43.89
Al <sub>2</sub> O <sub>3</sub>	36.9	35.6	35.39
CaO	20.2	13.45	19.29
MgO	0.05	0.16	0.01
Na <sub>2</sub> O	n.d.	0.20	0.32
K <sub>2</sub> O	n.d.	n.d.	0.03
BaO	n.d.	11.7	n.d.
Total	99.75	99.29	98.93

(1) Allende carbonaceous chondrite meteorite; average electron microprobe analysis; corresponds to Ca<sub>1.01</sub>Al<sub>1.96</sub>Si<sub>2.02</sub>O<sub>8</sub>. (2) Allende carbonaceous chondrite meteorite; average electron microprobe analysis; corresponds to (Ca<sub>0.74</sub>Ba<sub>0.27</sub>)Al<sub>1.93</sub>Si<sub>2.05</sub>O<sub>8</sub>. (3) Chelyabinsk coal basin, Russia; average of 4 electron microprobe analyses, corresponds to (Ca<sub>0.96</sub>Na<sub>0.03</sub>)<sub>Σ=0.99</sub>Al<sub>1.95</sub>Si<sub>2.05</sub>O<sub>8</sub>.

**Polymorphism & Series:** Trimorphous with svyatoslavite (monoclinic) and anorthite (triclinic).

**Mineral Group:** Feldspar group.

**Occurrence:** An ultra-refractory mineral in a rounded, coarse-grained, igneous Type B2 Ca-Al-rich inclusion (CAI) in a carbonaceous chondrite meteorite, formed early as a high-temperature condensate in the solar nebula. From burned coal dumps (Russia). By friction-melting along pseudotachylite-bearing faults (Italy).

**Association:** Gehlenitic melilite, Al-Ti-diopside, spinel, anorthite (meteorites); cordierite, mullite, anorthite, wollastonite, tridymite, fayalite, fassaite, norbergite-chondrodite, graphite, iron sulfides.

**Distribution:** From the Allende CV3 carbonaceous chondrite meteorite. From burned dumps, Kopeysk, Chelyabinsk Coal Basin, Ural Mountains, Russia. From the Gole Larghe Fault, Adamello batholith, Italy. Reported from the Kurumazawa quarry, Katashina, Gumma Prefecture, Japan.

**Name:** Honors Dmitrii Sergeevich Steinberg (b. 1910), noted petrologist, Institute of Geology and Geochemistry, Yekaterinberg, Russia.

**Type Material:** A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia.

**References:** (1) Chesnokov, B.V., E.V. Lotova, E.N. Nigmatulina, V.S. Pavlyuchenko, and A.F. Bushmakina (1990) Dmisteinbergite CaAl<sub>2</sub>Si<sub>2</sub>O<sub>8</sub> (hexagonal) - a new mineral. Zap. Vses. Mineral. Obshch., 119(5), 43-45 (in Russian). (2) (1992) Amer. Mineral., 77, 446-447 (abs. ref. 1). (3) Ma, C., A.N. Krot, and M. Bizzarro (2013) Discovery of dmisteinbergite (hexagonal CaAl<sub>2</sub>Si<sub>2</sub>O<sub>8</sub>) in the Allende meteorite: A new member of refractory silicates formed in the solar nebula. Amer. Mineral., 98, 1368-1371. (4) Takéuchi, Y. and G. Donnay (1959) The crystal structure of hexagonal CaAl<sub>2</sub>Si<sub>2</sub>O<sub>8</sub>: Acta Cryst., 12, 465-47.