

LETTER

**Davitsite, CaScAlSiO<sub>6</sub>, a new pyroxene from the Allende meteorite**

CHI MA\* AND GEORGE R. ROSSMAN

Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, California 91125, U.S.A.

ABSTRACT

Davitsite, ideally CaScAlSiO<sub>6</sub>, is a new member of the Ca clinopyroxene group, where Sc<sup>3+</sup> is dominant in the M1 site. It occurs as micro-sized crystals along with perovskite and spinel in an ultra-refractory inclusion from the Allende meteorite. The mean chemical composition determined by electron microprobe analysis is (wt%) SiO<sub>2</sub> 26.24, CaO 23.55, Al<sub>2</sub>O<sub>3</sub> 21.05, Sc<sub>2</sub>O<sub>3</sub> 14.70, TiO<sub>2</sub> (total) 8.66, MgO 2.82, ZrO<sub>2</sub> 2.00, Y<sub>2</sub>O<sub>3</sub> 0.56, V<sub>2</sub>O<sub>3</sub> 0.55, FeO 0.30, Dy<sub>2</sub>O<sub>3</sub> 0.27, Gd<sub>2</sub>O<sub>3</sub> 0.13, Er<sub>2</sub>O<sub>3</sub> 0.08, sum 100.91. Its empirical formula calculated on the basis of 6 O atoms is Ca<sub>0.99</sub>(Sc<sub>0.50</sub>Ti<sub>0.16</sub>Mg<sub>0.16</sub>Ti<sub>0.10</sub>Zr<sub>0.04</sub>V<sub>0.02</sub>Fe<sub>0.01</sub>Y<sub>0.01</sub>)<sub>Σ1.00</sub>(Si<sub>1.03</sub>Al<sub>0.97</sub>)<sub>Σ2.00</sub>O<sub>6</sub>. Davitsite is monoclinic, C2/c; *a* = 9.884 Å, *b* = 8.988 Å, *c* = 5.446 Å, β = 105.86°, *V* = 465.39 Å<sup>3</sup>, and *Z* = 4. Its electron back-scattered diffraction pattern is an excellent match to that of synthetic CaScAlSiO<sub>6</sub> with the C2/c structure. The strongest calculated X-ray powder diffraction lines are [*d* spacing in Å (*I*) (*hkl*): 3.039 (100) (221), 2.989 (31) (310), 2.943 (18) (311), 2.619 (40) (002), 2.600 (26) (131), 2.564 (47) (221), 2.159 (18) (331), 2.137 (15) (421), 1.676 (20) (223), and 1.444 (18) (531)]. The name is for Andrew M. Davis, a cosmochemist at the University of Chicago, Illinois.

**Keywords:** Davitsite, CaScAlSiO<sub>6</sub>, new mineral, Sc-rich pyroxene, refractory phase, ultra-refractory inclusion, Allende meteorite