

Kushiroite, $\text{CaAl}_2\text{SiO}_6$, a new pyroxene member in the ALH85085 CH chondrite

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Aluminian diopside is commonly encountered in refractory inclusions in many carbonaceous chondrites. Especially it often contains more than 40 wt.% Al_2O_3 , showing extreme enrichment in hypothetical Ca-tschermak component (CaTs). Here we documented the mineralogical features of such pyroxene in a refractory inclusion of ALH85085 (CH).

ALH85085 contains abundant refractory inclusions. A spherical inclusion consists of grossite in its center and surrounding pyroxene. The pyroxene contains 28.8-29.9 % SiO_2 , 40.3-42.4 Al_2O_3 , 1.0-1.2 FeO , 1.4-2.0 MgO and 25.1-26.2 CaO . The chemical formula is $\text{Ca}_{1.01}\text{Mg}_{0.09}\text{Fe}_{0.03}\text{Al}_{0.88}(\text{Al}_{0.92}\text{Si}_{1.08})\text{O}_6$ in average, which indicates 88% CaTs component. We identified the exact nature of this pyroxene by Raman and EBSD. These results are unambiguously consistent with synthetic CaTs. CaTs is one of the most important hypothetical components of pyroxene. Here we noticed that this component is no more hypothetical, but a really existing natural mineral.

This phase was approved by the Commission on New Minerals and Mineral Names, International Mineralogical Association as a new mineral with the name Kushiroite (IMA2008-059).