

Petrography and mineralogy of a unique spherical CAI in the Murchison(CM2) meteorite

Kentaro Kudo[1]; Hirokazu Fujimaki[2]

[1] Mineralogy, Petrology and Economic Geology., Tohoku Univ; [2] Earth and Planetary Sci., Tohoku Univ.

Calcium-aluminum-rich inclusions (CAIs), from chondritic meteorites are widely considered to represent the first materials that formed in the solar nebula.

I discovered for the first time a unique spherical CAI (Ca-Al-rich Inclusion), which consist of spinel, diopside, calcite, and PCP in the Murchison (CM2) meteorite. Its size is approximately 1.5mm and this is large when comparing with the size of chondrules in the all chondrites. Its shape is like chondrules, but fusion organization which is characteristic of chondrules is denied by absence of the glass and mesostasis. The unique spherical CAI never melts after the formation. Bulk composition is similar to Ca-Al-rich chondrules discovered in ordinary chondrites, or CAI of CV carbonaceous chondrite.

Comparison with normal CAI, its generated from different formation processes. The inside of the unique spherical CAI, spinel, diopside, calcite and PCP coexist each other. Replacement is not seen. Therefore, the unique spherical CAI is thought to be mixture of high temperature condensation minerals and low temperature minerals as well as aqueous alteration materials in the early solar nebula.