EGU21-1751
https://doi.org/10.5194/egusphere-egu21-1751
EGU General Assembly 2021

A rare free silica-bearing micrometeorite

Dafilgo Fernandes[1,2]
[1]National Institute of Oceanography, Council of Scientific and Industrial Research, Panjim, India
[2]Goa University, School of Earth, Ocean and Atmospheric Sciences, India (dafilgofernandes@gmail.com)

Extraterrestrial dust that reaches the Earth's surface has shown to represent the diverse types of samples from different precursors, namely, asteroid complexes and cometary bodies from the solar system. A substantial amount of this dust that strikes the upper atmosphere is believed to have been lost due to frictional heating with air molecules. Cosmic spherules that are melted particles are some of the widely recognized micrometeorites that survived this catastrophic entry process; however, their primordial characteristics are altered from their precursors making it difficult to identify the precursors. An individual peculiar spherule MS-I35-P204 recovered from the Antarctica blue ice has been identified. The spherule has been segregated using magnetic separation method, mounted in epoxy, and examined using SEM, subsequently analysed under electron microprobe. It is surrounded by a thin magnetite rim, and also holds a single kamacite bead that protrudes out at its top. The interior mineralogy mostly constitutes of a bulk pyroxene normative glass (MnO>2wt%) with several vesicles. The rare mineral phase is a skeletal aggregate of free silica, bearing Fe nuggets embedded in a glass. An isolated narrow lath of forsterite appears to be chondritic and is observed as relict grain that is associated with an anomalous low Ca pyroxene (MnO ~1.3 wt%, FeO~13 wt%). Earlier, free silica has been reported in some chondritic meteorites particularly the Enstatite and Ordinary group, and also in some carbonaceous chondrites such as CM, CR, CH, and K. It profoundly forms a pod that encloses the ferromagnesian silicate in silica-bearing chondrules. The unusual mineral assemblage seen in this spherule thereby appears to constrain probably the unique type of its contributor which need to be studied.