

Chemical evolution of presolar organics in astromaterials” **K. Nakamura-Messenger**,
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Sub- μm , hollow organic globules reported from several carbonaceous chondrites, interplanetary dust particles, and comet Wild-2 samples returned by NASA’s Stardust mission are enriched in $^{15}\text{N}/^{14}\text{N}$ and D/H compared with terrestrial materials and the parent materials [1-4]. These anomalies are ascribed to the preservation of presolar cold molecular cloud material from where H, C, and N isotopic constraints point to chemical fractionation near 10 K [5]. An origin well beyond the planet forming region and their survival in meteorites suggests submicrometer organic globules were once prevalent throughout the solar nebula. The survival of the membrane structures indicates primitive meteorites and cometary dust particles would have delivered these organic precursors to the early Earth as well as other planets and satellites. The physical, chemical, and isotopic properties of the organic globules varies to its meteorite types and its lithologies. For example, organic globules in the Tagish Lake meteorite are always embedded in fined grained (poorly crystallized) saponite, and hardly encapsulated in coarse grained serpentine, even though saponite and serpentine are both main components of phyllosilicate matrix of the Tagish Lake meteorite. The organic globules are commonly observed in the carbonate-poor lithology but not in the carbonate-rich one. In Tagish Lake, isolated single globules are common, but in the Bells (CM2) meteorite, globules are mostly aggregated. We will review the evolutions of the organic globules from its birth to alteration in the parent bodies in terms of its own physical and chemical properties as well as its associated minerals.

[1] Nakamura-Messenger K. et al. (2006) *Science*, 314, 1439-1442.

[2] Messenger S. et al. (2008) *Lunar Planet. Sci.* 34, Abst. #2391.

[3] Matrajt G. et al. (2008) *MAPS*, 43, 315-334.

[4] De Gregorio B. T. et al. (2010) *Lunar Planet. Sci.* 41, Abst. #2108

[5] Charnley & Rogers (2002) *ApJ* 569, L133.