THERMAL METAMORPHISM OF INSOLUBLE ORGANIC MATTER IN CARBONACEOUS CHONDRITES.

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Introduction: As a continuation of our studies of chondritic insoluble organic matter (IOM)[1], we have initiated studies of the effects of thermal metamorphism. We have isolated IOM from Allende CV3.3 [2] and Y86720 a strongly heated CM [3]. Solid state ^{13}C NMR spectra of these IOM are compared with spectra from Tagish Lake (C2) and EET92042 (CR2) (Figure 1).

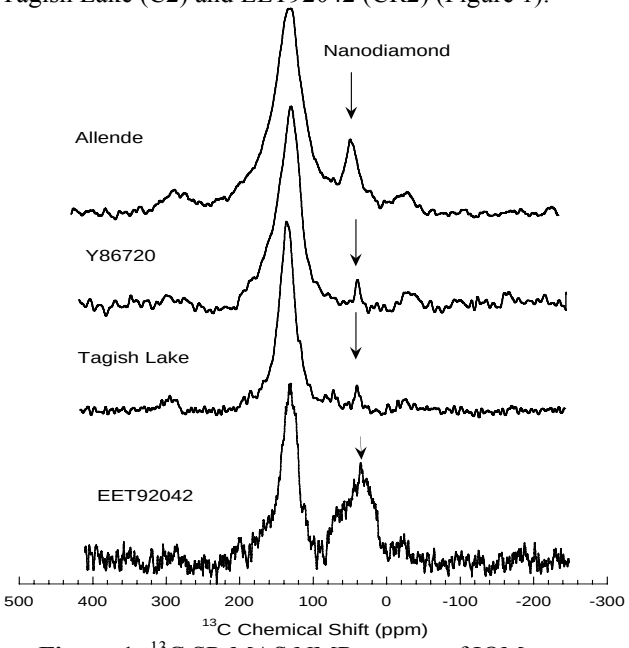

Figure 1: ^{13}C SP-MAS NMR spectra of IOM.

EET92042 (CR2) IOM is both chemically and isotopically the most primitive IOM we have studied. Tagish Lake suffered oxidation during parent body processing. Both Allende and Y86720 yield unusual spectra that exhibit significant paramagnetic broadening consistent with an abundance of unpaired electrons (radicals) generated during thermal metamorphism. They also contain abundant O-containing organic functional groups and are not graphitic solids. Allende's spectrum exhibits strong nanodiamond peak suggesting considerable loss of organic C with metamorphism. The thermal metamorphism of IOM correlates strongly with both an increase in C/N, C/H, and a reduction in N and D. From these data it appears that Allende's IOM has suffered more thermochemical modification than Y86720.

References:[1] G.D.Cody et al. 2002 *Geochim. Cosmochim Acta*., 66:1851-1865. [2] Symes et al. 1993 *Meteoritics* 28:446-447. [3] Akai 1992 Proc. NIPR Symp. Antarct. Meteorites 3:55-68.