**THE MISSING ACHONDRITES: TAKING A PINCH OF SALT WITH THE NEBULA.** Jeremy S Delaney. Rutgers University. New Brunswick, NJ, USA jsd@rci.rutgers.edu.

The formation of achondrites is typically associated with temperatures that cause magmatic, or near-magmatic reprocessing of chondritic precursors. This view is incomplete. The formation of planetesimals (and the process of aggregation that must occur to form the planets, planetoids and asteroids of the solar system) can initially produce cold objects as well as the hot bodies implied by evidence of magmatism. Objects that form sufficiently early in the evolution of the Solar System, will have a significant budget of short-lived isotopes that decay producing internal heating of the body. (Other heating mechanisms may also apply.) Heating of these bodies from nebular ambient temperatures to silicate melting temperatures occurs. The presence of fully differentiated bodies requires this. The initial heating step in planetary differentiation subjects the interior of the body to steadily rising temperatures and has predictable consequences.

Consider the gradual heating of a mass of CI composition (as an approximation of Solar composition). Apart from very volatile gases, the first material mobilized in the warm interior of the body will be water+/- $CO_2$ (~273-600K) from both surface coatings and hydrous minerals. Breakdown of hydrous minerals may well lead to dissolution of elements such as Na, K, F, Cl, I, C, S and others into $H_2O$ solution. Melting of ices and dehydration of the interior of a warming object should lead to significant leaching of several traditionally 'volatile' elements into solution. The remaining solids will acquire at least part of the 'volatile depleted' signature that characterizes many meteorite groups, especially achondrites. The dissolved components will migrate toward the surface of the object in response to the thermal gradient established by internal heating. At that surface, evaporation of the water to the nebula will cause efflorescence on those surfaces. Masses of salt crystals with a range of compositions will be produced 'contaminating' the sample surface. A crust of evaporite minerals on the surface seems inevitable (Halite, sylvite, anhydrite, gypsum, calcite...). Dehydration of a CI composition object may well lead to the initial formation of an evaporite crust upon initiation of planetary differentiation.

No evaporite-rich achondrites are known, but the physical properties of these minerals (low melting points, high solubility in water, easy comminution of minerals) inevitably lead to a prediction of extreme rarity. Asteroids with evaporite crusts are not known. However, the Vis-NIR spectra of these evaporite minerals are, with the exception of a water band, dominated by their transparency! Spectra from asteroids with evaporite crusts may well show only the underlying mineralogy, not the surface evaporite mineralogyy. More extensive searches (from orbit) in the far-IR may reveal salty bodies, as may gamma spectroscopy (K,Cl) such as that on the Dawn mission. The most likely parent bodies to preserve salty crusts are those on which whole body differentiation is incipient or incomplete -- ordinary chondrite and primitive achondrite bodies. The missing achondrites should not be ignored.