SHAPE, SIZE, AND DISTRIBUTION OF MAGNETIC PARTICLES IN BJURBOLE CHONDRULES

David F. Nava, Astrochemistry Branch, Code 691, NASA Goddard Space Flight Center, Greenbelt, Maryland 20771, USA.

Chondrules from the Bjurbole chondritic meteorite (L4) exhibit saturation remanence magnetization (SIRM) values which vary over three orders of magnitude [1]. REM values (Natural Remanence Magnetization/SIRM) for Allende (C3V) and Chainpur (LL3) are <0.01 but in Bjurbole some chondrules were found to have REM values >0.1 with several >0.2. REM values >0.1 are abnormal and cannot be acquired during weak field cooling. If exposure to a strong field (whatever the source) during the chondrules' history is responsible for the high REM values, was such history associated with a different processing which might have resulted in different shape, size, and distribution of metal particles compared to chondrules having REM values of <0.01? Furthermore, magnetic hysteresis results show a broad range of magnetic hardness and other intrinsic magnetic properties. These features must be related to a) size and amount of metal, and b) properties of, and amount of, tetrataenite in the chondrules (all chondrules thus far subjected to thermomagnetic analysis show the presence of tetrataenite) [2]. A scanning electron microscopy (SEM) study is underway to determine the relationship between the shape, size, and distribution of metal particles within individual chondrules and the magnetic properties of these chondrules. Results from the SEM study in conjunction with magnetic property data may also help to discern effects from possible lightening strikes in the nebula prior to incorporation of the chondrules into the parent body.

REFERENCES:

[1] Wasilewski, P. J., et al., (1993) Lunar Planet. Sci., XXIV, 1485.
[2] Wasilewski, P. J., and O'Bryan, M. V., (1994) Lunar Planet. Sci., XXV.