AN EXTENSIVE ANALYSIS OF CHONDRULE TEXTURES IN UN-EQUILIBRATED ORDINARY CHONDRITES AND THE CREATION OF A CHONDRULE DATABASE.

D. Sheikh[1], [1]Department of Geological Sciences, University of Florida, Gainesville, FL, 32611 (danielsheikh68@gmail.com).

Introduction: Chondrule textural schemes have been developed and improved upon since the days of Tschermak [1]. While existing schemes allow for the grouping of chondrules based on general textural and chemical observations, these schemes alone do not provide enough detailed information for each individual chondrule. A study analyzing 260 chondrules from 13 different un-equilibrated ordinary chondrites utilizing a combination of multiple textural and mineralogical schemes [2,3,4] found that implementing multiple schemes together would provide enough detailed information necessary in order to distinguish each individual chondrule. Individualizing each chondrule, rather than simply grouping them, could potentially provide more insight and help constrain chondrule formation mechanisms and conditions. A chondrule database system focused on individual, detailed information for each chondrule would provide such means of information, while at the same time providing an open access system available to the scientific community.

Methods: For this study, 260 chondrules from 13 different un-equilibrated ordinary chondrites were analyzed under the scanning electron microscope (SEM) using the back-scattered electron (BSE) detector. Chondrules were imaged using the BSE detector in order to observe their internal textures, and the usage of the energy-dispersive detector (EDS) allowed for the identification of minerals present in each chondrule.

Chondrule identification was carried out using the following criteria: chondrule apparent diameter, chondrule rim type, metal type present in chondrule, olivine fayalite percentage, pyroxene ferrosilite percentage, and multiple chondrule textural and chemical schemes [2,3,4].

Results: Data collected from each chondrule was stored as an entry into a chondrule database system. Each chondrule was assigned its own page in the database in order to further help with the individualizing process used to describe their textural and chemical features with more detail. Each of the resulting pages provided an image of the chondrule being described, a section designated for each of the chondrule identification criteria, and the raw EDS chemical data collected from each chondrule during the mineral identification process (Fig. 1).

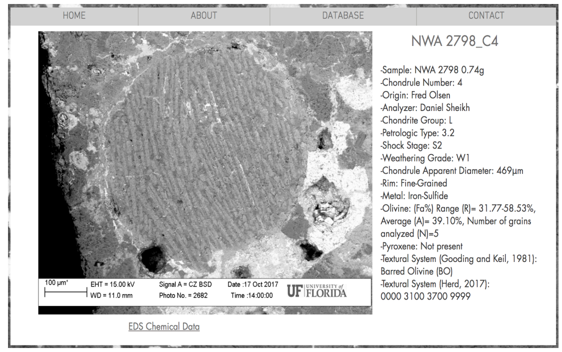

Fig. 1: *Chondrule data stored in a chondrule database sytem.*

Conclusion: Rather than simply defining and grouping chondrules solely based on textural and chemical schemes, a chondrule database system would seem as the more accurate method of chondrule data collection moving forward. Having a large enough chondrule database would allow for the collected information to be gathered, analyzed, and shared throughout the scientific community as an open access system. Using a chondrule database system to individualize chondrules, rather than group them, could potentially better constrain chondrule formation mechanisms and conditions.

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