

**TESTING NUMERIC CODES FOR CHONDRULE TEXTURES.** R. K. Herd<sup>1</sup>. <sup>1</sup>Curator, National Meteorite Collection of Canada (Retired) [herdrk@gmail.com](mailto:herdrk@gmail.com) .

**Introduction:** Numeric codes resembling ISBNs, Bar Codes, or Credit/Debit Card numbers have been developed to describe intra-chondrule textures in ordinary chondrites and wherever they may be useful [1]. They do not replace, but they do enhance, the most robust textural-mineralogical scheme in use for over 35 years [2]. Available BSE grey-scale photos of chondrules are being reviewed and codes developed for each one, in the same and different chondrites. Here a subset of chondrules originally investigated as representative of those occurring in the L4 chondrite Saratov are updated with these codes.

**Methodology:** The codes allow an at-a-glance means of recording mineralogy and textures dominated by bi- or multi-modal crystal-size populations of olivine (O) and pyroxene (P) of variable habit. Recognizing that the size distribution of minerals and crystals in chondrules can be subdivided into four size ranges for each and every chondrule -- megacrystic (M), macrocrystic (m), microcrystic ( $\mu$ ), and mesostasis (*ms*) -- with tags for equant (q), elongate (l), angular (a), and rounded (r), an alphabetic scheme was the precursor of the numeric codes. The most up-to-date and improved version of the new system substitutes numbers for the letters, arranged in 4 sequential fields with 5 slots each: 1=Ola, 3=Olr, 5=Oqa, 7=Oqr, 2=Pla, 4=Plr, 6=Pqa, 8=Pqr, 9=unresolvable, 0=not present. \*spaces are for notes on the immediately preceding size ranges.

**Results:** POP chondrule S1 yields the code:

S1        0000\*1560\*0000\*9999\*

The first five digit spaces are for M. At each scale the left 2 spaces are assigned to O, the right 2 spaces to P. As above, odd numbers describe olivine, even numbers pyroxene, except for 9 and 0. The next five digit spaces are for m, the next for  $\mu$ , and the last for *ms*. At-a-glance it can be seen that the texture within this chondrule is derived mainly from major elongate and minor equant olivine, and major equant pyroxene, at the macrocrystic scale. No assemblages at the M or  $\mu$  scale contribute to the texture, and the olivine and pyroxene macrocrysts are set in a largely unresolvable mesostasis.

PPO chondrules S9 and S14 yield the codes:

S9:        0000\*0760\*0000\*9999\*  
S14:       0000\*0760\*0000\*9999\*

The textures within these chondrules are virtually identical, derived from minor (relict) rounded equant olivine set in angular equant pyroxene at the macrocrystic scale. No assemblages at the M or  $\mu$  scale contribute to the texture, and the pyroxene macrocrysts are set in a largely unresolvable mesostasis.

Observations have been made during the assignment of these codes that are relevant to the crystallization and re-crystallization of the chondrules, so a picture emerges of the kinds of chondrules present in the chondrite, and of the processes they have undergone. This is much more useful to understanding the origin of chondrules than lumping them texturally.

**References:** [1] Herd, R.K. 2017. Abstract #2033. Workshop on Chondrules and the Protoplanetary Disk. [2] Gooding, J.L. & Keil, K. 1981. *Meteoritics & Planetary Science* 16: pp. 17-43.