DENSITY AND POROSITY MEASUREMENT OF ORDINARY CHONDRITES USING PYCNOMETER-BALLOON VACUUM PACKING METHOD

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As a fundamental physical property, porosity, which might play important roles in thermal evolution and asteroid impact of meteorite parent body. Therefore, availability of high accuracy porosity data of meteorites would benefit scientists who interested in asteroid porosity. The bulk densities and porosities of 36 fragments from 22 fall ordinary chondrites were measured via pycnometer-balloon vacuum packing method which was developed by Li et al. [1].

Twenty-one fall H chondrite fragments with grain densities range from 3.6574 to 3.9814 g/cm^3. Among these samples, the grain densities of Gao-Guenie and Laochengzhen are 3.6574 g/cm^3 and 3.6893 g/cm^3, respectively. Compared with other H ordinary chondrites, lower grain densities of these two samples due to the weathering. The bulk densities and porosities of these 21 samples range in 3.2577-3.6238 g/cm^3 and 0.9124%-17.6066%, respectively. Similar to grain densities, the porosities of Gao-Guenie (0.9124%) and Laochengzhen (2.9277%) were significantly influenced due to terrestrial weathering. Seven fall L chondrites with the grain densities, bulk densities and porosities range in 3.5624-3.6248 g/cm^3, 3.1345-3.5551 g/cm^3, and 1.9239%-12.3517%, respectively. The porosity of Heyetang (L3, W1) is 1.9239%, which might also be caused by weathering. For 4 fall LL ordinary chondrites, the grain densities, bulk densities and porosities range in 3.4787-3.5429 g/cm^3, 2.9703-3.2790 g/cm^3, and 7.1752%-16.1605%, respectively. Follow-up measurement of grain densities, bulk densities and porosities of Antarctic finds and non-Antarctic finds will be carried out and the results will be presented at the meeting.

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References: [1] Li S. J. et al. 2012. Journal of Geophysical Research 117: E1001.