

COSMOGENIC NEON FROM INDIVIDUAL OLIVINE GRAINS OF CHONDRULES AND CHONDRITES. J. P. Das¹, K. Kehm², J. N. Goswami³, O. V. Pravdivtseva¹, A. P. Meshik¹ and C. M. Hohenberg¹. ¹Department of Physics, Campus Box 1105, Washington University, 1 Brookings Drive, Saint Louis, MO 63130, USA., jdass@physics.wustl.edu ²Physics Department, Washington College, 300 Washington Ave., Chestertown, MA 21619, USA. ³Physical Research Laboratory, Ahmedabad-380009, India.

Introduction: Study of individual grains from Murchison, Murray, Cold Bokkeveld (CM2) and Orgueil (CI) has provided evidence of either exposure to energetic early Sun or regolith exposure [1-2]. On the other hand, if chondrules were formed close to early Sun as suggested by X-wind model [3], record of exposure to energetic solar radiation is expected from chondrules or their phases. However, such records are rarely detected [4, 5]. We are analyzing individual olivine grains from chondrites [Rio Negro (L4), Cochabamba, and Mighei (CM2)] and chondrules [from Murchison (CM2), Chainpur (LL3.4), Bjurböle (L/LL4), Dhajala (H3.8) and Parsa (EH3)]. EDX spectra were measured for each grain to confirm the mineralogy and obtain the target chemistry to calculate the ²¹Ne production rate due to cosmic ray exposure (CRE). Neon was then released from each grain by laser melting and analyzed by high sensitivity mass spectrometer.

Results and Discussion: Nine irradiated and eight unirradiated grains from Rio Negro and 29 unirradiated grains from Cochabamba are analyzed so far. For both kinds of Rio Negro grains, the distribution of CRE ages are similar and comparable to the estimated CRE age of Rio Negro bulk. All grains from Cochabamba except K1-2C6 have CRE ages around 2 Ma, a typical CM2 CRE age. K1-2C6 shows additional exposure of ~3 Ma (a exposure time in 4 π stage). This yields a pre-compaction regolith exposure (2 π stage) time of about 7.5 Ma for this grain. This suggests that this grain remained on the parent body surface for around 7 Ma, a shorter time period than the long regolith exposure time required for Murchison and Murray grains [1]. We are currently analyzing more olivine grains from chondrites and chondrules and the results will be discussed during the meeting.

References: [1] Hohenberg et al. 1990 *Geochimica et cosmochimica Acta* 54:2133-2140 [2] Nichols et al. 1992. Abstract #1490 23rd Lunar & Planetary Science Conference. [3] Shu et al. 2001. *Astrophysical Journal* 548:1029-1050. [4] Das J. P. and Murty S. V. S. (2005) In International Cosmic Ray Conference, 101-104. [5] Roth et al. 2009. Abstract #1838, 40th Lunar & Planetary Science Conference.