THE Al-Mg SYSTEM IN CHONDRULES: A TWO-PRONGED APPROACH. J. L. Claydon[1], Y.–J. Lai[2*], C. D. Coath[2], C. A. Taylor[2], T. Elliott[2], S. Strekopytov[1], J. Spratt[1], A. T. Kearsley[1] and S. S. Russell[1]. [1]Department of Earth Sciences, Natural History Museum, Cromwell Road, London, SW7 5BD, U.K E-mail: j.claydon@nhm.ac.uk. [2]Bristol Isotope Group, School of Earth Sciences, University of Bristol, Wills Memorial Building, Bristol, BS8 1RJ, U.K. *Now at Institut für Geochemie & Petrologie, ETH Zürich, 8092 Zürich, Switzerland.

Introduction: Chondrules are the dominant component in most chondritic meteorites but their formation is not well understood. Constraining the chronology of chondrules can help shed light on these thermal events. It has long been thought that chondrules formed 1-3 Myr after CAIs. However, more recent work [1 - 3] points to chondrule formation starting at the same time as CAI formation, whilst other authors suggest the formation of planetesimals and chondrules is linked [4]. We aim to better understand the history of chondrules by using the Al-Mg system.

Methods: Chondrules were separated from bulk samples of Mokoia (BM1910, 729) and Vigarano (BM1911, 174), split into two aliquots and prepared as described previously [5]. Characterisation was carried out using the Zeiss EVO 15LS Scanning Electron Microscope and Cameca SX100 Electron Microprobe at the NHM. Al/Mg ratios were measured by quadrupole ICP-MS (Agilent 7700x) at the NHM. Mg isotopes were measured using the Thermo Finnigan Neptune MC-ICP-MS at the University of Bristol; samples were bracketed with the DSM-3 isotopic reference standard for Mg [6]. We also plan to study the Al-Mg system in aliquots of these samples using NanoSIMS in order to compare the bulk $^{26}Al/^{27}Al_i$ of the samples with the internal $^{26}Al/^{27}Al_i$ of individual mineral phases.

Results & Discussion: Of ~80 separated chondrules, we focus on those that show either super-chondritic or sub-chondritic $^{27}Al/^{24}Mg$ along with excesses of $^{26}Mg^*$. Accurate bulk $^{26}Al/^{27}Al_i$ ratios at this level of precision are compromised by lack of knowledge of the initial $^{26}Mg^*/^{24}Mg_i$, which is needed to construct a two-point "isochron". If we follow the approach of [3] and use the $^{26}Mg^*/^{24}Mg_i$ of CAIs (-38 ppm [7]) then our calculated *bulk* $^{26}Al/^{27}Al_i$ ratios are higher than reported *internal* $^{26}Al/^{27}Al_i$ ratios for other CV chondrules [8]. However, $^{26}Mg^*/^{24}Mg_i$ = -38 ppm may not be representative of the chondrule forming region [9]. We can constrain this value by analysing samples with low $^{27}Al/^{24}Mg$. A Mokoia chondrule with low $^{27}Al/^{24}Mg$ (0.01) shows positive $^{26}Mg^*$ suggesting redistribution of Mg. We are now focusing on chondrules that show low $^{27}Al/^{24}Mg$ along with bulk matrix from both Mokoia and Vigarano in order to constrain the $^{26}Mg^*/^{24}Mg_i$ ratio for the CV parent body and aid the interpretation of bulk $^{26}Al/^{27}Al_i$ ratios.

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