DATING THE EARTH-LIKE RESERVOIR FORMATION IN THE SOLAR NEBULA WITH ENSTATITE CHONDRITE. Q.-Z. Yin[1], E. Gaidos[2], M. E. Sanborn[1], and Shijie Li[3]. [1]Dept. Earth & Planet. Sci, Univ. of California, Davis, CA 95616, (qyin@ucdavis.edu), [2]Dept. Geol. & Geophys., Univ. of Hawai'i at Manoa, Honolulu, HI 96822. [3]Institute of Geochemistry, CAS, Guiyang, China

Here we report the ^{53}Mn-^{53}Cr age of chondrules extracted from the most primitive EH3-type enstatite chondrite, *Qingzhen*, one of the most reduced meteorites, well known for its Si-bearing metal, and sulfide phases that contain typically lithophile elements. The ^{53}Mn-^{53}Cr isochron obtained for Qingzhen gives an initial ^{53}Mn/^{55}Mn of $(3.69\pm1.08)\times10^{-6}$ and $\varepsilon^{53}Cr_i = -0.11\pm0.08$ (MSWD = 0.44). Relative to the D'Orbigny age anchor with its U isotope-corrected Pb-Pb age (Amelin, 2008; Brennecka and Wadhwa, 2012) and its precise ^{53}Mn/^{55}Mn (Glavin et al., 2004; Yin et al., 2009), we obtain a 4,564.8±1.6 Ma formation age of Qingzhen's chondrules.

Unlike Allende (CV3) chondrules (Yin et al., 2009), the ε^{54}Cr anomaly of each individual chondrule in Qingzhen is uniform and Earth-like (with an average $\varepsilon^{54}Cr = 0.12\pm0.14$). Enstatite chondrites (ECs) and enstatite achondrites (aubrites) are remarkable in their isotopic similarity, as well as their chemical dissimilarity to Earth (*c.f.* Gaidos and Yin 2015). We argue that our Qingzhen chondrule ^{53}Mn-^{53}Cr age dates the Earth-like pre-planetary reservoir formation/isolation in the solar nebula, which is distinct isotopically from most materials in the inner Solar System. Isotopic homogeneity of this reservoir is clearly established at both micro- and macroscopic levels by 4,564.8±1.6 Ma. Because our ^{53}Mn-^{53}Cr age and a few other established sulfide ages of ECs and aubrites (Wadhwa et al., 1997; Guan et al., 2007; Telus et al., 2007) all precede the Moon-forming giant impact (Yin et al., 2002; Kleine et al., 2009) and the fact that post-impact Earth and the Moon are isotopically very similar to ECs and aubrites, the impactor *Theia* must also have been isotopically very similar to ECs and Earth. Otherwise, the post-giant impact Earth and the Moon would deviate isotopically from that of ECs. Likewise, the isotopic similarity of Earth and ECs and the Earth's unique end-member position in multi isotopic space constrains the amount of any non-enstatite-like material accreted either before or after core closure (Dauphas et al., 2004; Fischer-Goeddle et al., 2015).

We infer that the closure of the Earth/EC-like isotopic reservoir by 4,564.8±1.6 Ma represents the formation of Jupiter and the clearing of the disk immediately outside the terrestrial planet formation zone, as well as excitation of planetesimals. This is consistent with the latest observations and models. We suggest that the EC reservoir deviated at 4,564.8±1.6 Ma, or shortly thereafter, from that of the Earth's chemically, by SiO/SiS gas interactions with solids (Lehner et al., 2015), creating its unique chemistry, explaining its low δ^{30}Si and low Mg/Si ratio (Dauphas et a., 2015). The processes responsible for changes in EC chemistry must be a local phenomena, as it did not affect the bigger reservoir represented by the bulk Earth composition. Existing ^{53}Mn-^{53}Cr dates on sulphide phases in ECs (e.g. Telus et al., 2012) tend to be much later than 4,564.8±1.6 Ma. However, the ^{53}Mn-^{53}Cr systematics in sulphides could be affected by parent body processes, whereas SiO/SiS gas interaction with solids which changed the EC chemistry could not have occurred on a parent body.

LIFETIME OF THE SOLAR NEBULA AND NEBULAR MAGNETIC FIELD. B. P. Weiss[1], H. Wang[1], R. Fu[2], B. Downey[1], X. Bai[3], [1]Department of Earth, Atmospheric, and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, MA, USA, [2]Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY, USA, [3]Institute for Theory and Computation, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, USA.

A key stage in planet formation is the evolution of a gaseous and magnetized solar nebula and protoplanetary disk. The solar nebula magnetic field is thought to play an important role in stellar accretion and the formation of the first solids, but its lifetime is poorly constrained. Here we present paleomagnetic analyses of volcanic angrites demonstrating that they formed in a near zero-field (<0.1 μT) environment ~4 million years (My) after the formation of calcium-aluminum-rich inclusions (CAIs). Combined with our paleomagnetic analyses of LL and CR chondrules, this indicates that the solar nebula field, and likely the nebular gas itself, dispersed sometimes between 2.5 and 4 My after CAI formation. This implies that accretion of the Sun and gas giants was largely complete by this time and favors formation of younger chondrules by planetesimal collisions over nebular shocks and electric currents. Our data also indicate that the onset of the core dynamo on the angrite parent body was delayed until between ~4-11 My after solar system formation, consistent with thermal blanketing of planetesimal cores by ^{26}Al-enriched mantles.