Os ISOTOPIC EVOLUTION AND FRACTIONATION OF HIGHLY SIDEROPHILE ELEMENTS IN THE EARLY SOLAR SYSTEM M. I. Smoliar[1], M. F. Horan[1], C. M. O'D. Alexander[1], and R. J. Walker[2], [1]DTM, Carnegie Institution of Washington, 5241 Broad Branch Road NW, Washington DC, 20015, USA, [2]Department of Geology, UMCP, College Park, MD 20742, USA.

Re-Os analysis of mineral fractions and chondrules from Allegan (H5) yield a precise isochron (4568±11 Ma, initial $^{187}Os/^{188}Os$ = 0.09542±6). The Allegan isochron comprises handpicked metal, olivine, and several types of chondrules. FIG. 1 shows this result (filled diamond) along with previous Re-Os results for magmatic [1] and non-magmatic [2] irons, and Ochansk (H4). The Re-Os age of Allegan coincides within uncertainties with that of IIIA iron meteorites, and is resolvably older than the ages of the other magmatic groups. Both studied H-chondrites, along with non-magmatic IAB irons, plot within error limits on the evolution line defined by magmatic iron meteorites. This fact implies isotopic homogeneity of primordial Os in differentiated and chondritic parental bodies.

HSE distribution patterns determined for mineral fractions of Allegan, Ochansk, and Tieschitz show that surprisingly high levels (~10% of bulk CI) of Os, Ir, and Ru reside in non-metal components (e.g., troilite, olivine). All analyzed olivine samples are strongly enriched in Pt (up to 10 x CI in terms of Pt/Ir ratio). Conversely, these fractions display prominent depletions in Pd (from 10 to 100 times relative to bulk CI). Rhenium and Os are significantly fractionated among chondritic components: from supra-chondritic Re/Os ratios in coarse metal and troilite (up to 1.3 x CI) to strongly sub-chondritic in olivine and plagioclase, as well as in some types of chondrules. Duplicate analyses of two excentroradial chondrules from Allegan have extremely low Re/Os ratios (~0.2 x CI) implying that strong HSE fractionation occurred during chondrule formation.

Conclusions: High-precision Re-Os isochrons for Allegan and Ochansk may permit a direct reconciliation of Re and U decay constants. These results also demonstrate the capabilities of the Re-Os system for studies of early Solar System processes; from chondrule formation to thermal metamorphism.

Acknowledgments: This work is funded by NRC Research Associateship through NASA NAI and CIW/DTM. Some aspects of this work were supported by NASA grant NAG510425 (to RJW).

References: [1] Smoliar M.I. et al. 1996. *Science* ***271,*** 1099–1102. [2] Horan M.F. et al. 1998. *Geochimica et Cosmochemica Acta* ***62***, 545-554.

FIGURE 1: Os isotopic evolution for various planetary materials.