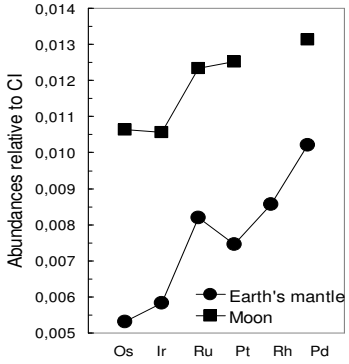
Os, Ir, Ru, Pt, Rh, and Pd in Earth's crust, mantle and moon

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The noble metal composition of the Earth's upper continental crust is essential for understanding its origin and the fundamental processes by which it formed. Estimates of noble metals of the upper continental crust have shown that elemental ratios of Os, Ir, Ru, Pt, Rh, Pd, and Ni in the upper crust are highly fractionated [1], compared to the Earth's mantle [2] and CI-chondrites. The abundance distribution apparently indicates two groups of elements; (1) Os and Ir and (2) Ru, Pt, Rh, Pd, and Ni. Interestingly, the fractionation pattern from IIIAB iron meteorites (e.g., Grant) and pallasites (Brenham, Giroux, Somervell County, South Bend) are comparable with a compilation of the present upper continental crustal data suggesting processing of the Earth's crust by large impact events. The upper continental crust probably preserves an imprint of some of the major fractionation processes which have occurred in magmatic iron meteorites or pallasites.

In comparison to the Earth's mantle, Apollo 17 impact melt rocks which provide the only direct chemical link to the late accretionary period (3.9-4.5 Ga) [3] show slightly different noble metal patterns (see Fig.) than the "late accreted materials" on Earth (e.g. Ru/Ir in Earth's mantle is 2.01±0.12, in lunar melt rocks, uncorrected for indigeneous Ru (2.01 ±0.72 ng/g [4]) the Ru/Ir ratio is 1.68±0.09). Interestingly, the indigeneous Ru and Pd (2.86 ±0.94 ng/g [4]) in Apollo 17 melt rocks derived by linear correlations vs. Ir are in good agreement with contents derived from the Earth's crust [1].



[1] Schmidt G., Palme H., and Kratz K.-L. (2005) M&PS **40,** A135. [2] Schmidt G. (2004) M&PS **39,** 1995-2007. [3] Puchtel I.S.,Walker R.J., James O.B. (2005) LPSC XXXVI, #1707**.** [4] Puchtel I.S., Walker R.J., James O.B. (2006) LPSC XXXVII, #1428**.**