

Hafnium-tungsten Isotopes



The **refractory** elements, hafnium (Hf) and tungsten (W), are marvels when it comes to studying the history of planetary bodies and the timing of **accretion**, **differentiation**, and core formation. The **siderophile** nature of W and the **lithophile** manner of Hf make the short-lived Hf-W **isotope** system a valuable dating technique in planetary science (for example, see **PSRD** article: **Hafnium, Tungsten, and the Differentiation of the Moon and Mars**).

Thorsten Kleine (Institut für Planetologie, University of Münster) and Richard Walker (Department of Geology, University of Maryland) provide a thorough review of the ^{182}Hf - ^{182}W chronometer, a precision timer based on the decay of the short-lived radionuclide ^{182}Hf (**half-life** of only 9 million years) to stable

^{182}W . Their paper "Tungsten Isotopes in Planets" covers the basic principles of the chronometer and its use in **chondritic** meteorites, differentiated meteorites, **achondrites**, Martian meteorites, the Moon, and Earth. Among the important discoveries made with tungsten isotopic data, we now know timescales of accretion and core formation increased with planetary mass. In their wrap-up, Kleine and Walker discuss the immense value of tungsten isotopes in understanding the origin of the Moon (for example, see **PSRD** article: **Tungsten Isotopes, Formation of the Moon, and Lopsided Addition to Earth and Moon**).

See Reference:

- Kleine, T. and Walker, R. J. (2017) Tungsten Isotopes in Planets, *Annual Review of Earth and Planetary Sciences*, v. 45, p. 389-417, doi: 10.1146/annurev-earth-063016-020037. [[view online](#)]

See also:

- Taylor, G. J. (Nov. 2003) Hafnium, Tungsten, and the Differentiation of the Moon and Mars. *Planetary Science Research Discoveries*. <http://www.psrdd.hawaii.edu/Nov03/Hf-W.html>.
- Taylor, G. J. (June 2015) Tungsten Isotopes, Formation of the Moon, and Lopsided Addition to Earth and Moon. *Planetary Science Research Discoveries*. <http://www.psrdd.hawaii.edu/June15/W-Earth-Moon.html>.

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