

The use of ^{187}Re - ^{187}Os isotopes in revealing magmatic processes on Mars

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Rhenium and osmium are highly siderophile elements (HSE) that can help in revealing the genesis of asteroidal and planetary cores and mantles. In particular, the ^{187}Re - ^{187}Os isotope system can be used to answer key issues in planetology and cosmochemistry, as insights on core formation, early differentiation, and late accretion events in terrestrial planets (Shirey and Walker, 1998; Righter et al., 2000).

Studying the Re-Os systematics on Martian meteorites is critical for an understanding of the mantle evolution of Mars, and to constrain whether one or more magmatic reservoirs derived from crystallization of a magma ocean. The similar content in Os in terrestrial and Martian basalts would argue that the sources for both planets had the same abundances in Os and HSE, this is also true for ultramafic rocks on Mars and Earth (Birck & Allegre, 1994; Warren & Kallemeyn, 1996). Thus, Os isotopes can be used to obtain the relative abundance of Re and Os on Earth as well on Mars, assuming the very similar HSE content of both mantles (Shirey & Walker, 1998).

References

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