Highly siderophile element (HSE) geochemistry of carbonatites and associated alkaline rocks from Tamil Nadu, India

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Carbonatites represents a potential economic resource of HSE (e.g., Phalaborwa, South Africa; Ipanema, Brazil [1]), but they can also provide insights into HSE fractionation in Earth's upper mantle during the production of CO_2-rich magmas. However, the existing data on HSE distribution in carbonatites are sparse [2].

We present the first HSE abundances, paralleled by $^{187}Os/^{188}Os$ ratios for the suite of carbonatites and associated alkaline rocks (syenite, monzonite, pyroxenite) from Samalpatti and Sevattur, Tamil Nadu region, India, with an age of ~770 Ma [3]. The HSE concentration and Os isotopic ratios were determined by standard methods involving decomposition in Carius Tubes, separation of Os by $CHCl_3$ and Ir, Ru, Pd, Pt isolation by anion exchange chromatography, following decarbonation with HCl.

Preliminary results indicate that the carbonatites and alkaline rocks have indistinguishable and very low HSE contents in the range of 1–41 ppt Os, <50 ppt Ir and Ru, and elevated contents of Pt (up to 811 ppt) and Pd (up to ~1800 ppt) while Re exhibits the highest contents in carbonatites (up to 1 ppb). The HSE patterns are characterized by steep enrichment of Pd–Re over Os–Ir–Ru (Pd_N/Ir_N=~3–64). Such values, in combination with highly radiogenic present-day $^{187}Os/^{188}Os$ ratios between ~1.2 and ~5.9, indicate most likely derivation of the suite by melting of continental crust.

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[1] Fonza (2006) *Platinum metals Rev*. **50**, 134-142
[2] Xu et al. (2008) *Lithos* **105**, 201-207
[3] Kumar et al. (1998) *GCA* **62**, 515-523