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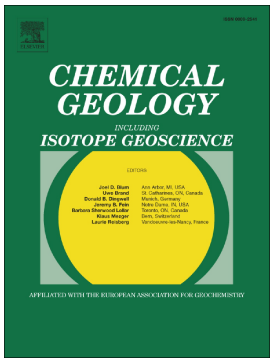

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Comparison of chemical procedures for Re-isotopic measurements by N-TIMS

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ABSTRACT

Precise and accurate measurements of the isotopic composition of rhenium (Re) in geologic samples are of paramount importance for the successful application of the Re-Os geochronometer. Two methods for chemical isolation of Re are used in the geochronology community – column chemistry using anion exchange resin and solvent-solvent extraction using a sodium hydroxide-acetone mixture. Despite their ubiquitous application, a systematic comparison of these two methods is missing. Here we compare Re-isotopic data on a variety of samples (sulfides, hydrocarbons, shales, and in-house standard solutions) that were processed by both chemical methods. Measured $^{185}Re/^{187}Re$ ratios for both methods have similar precision and overlap within the propagated long-term analytical reproducibility of ~1‰ for samples that yield moderate to strong intensities (>50 mV on the weaker Re mass). In contrast, measured $^{185}Re/^{187}Re$ ratios for most samples that yield less intense Re signals (<50 mV on the weaker Re mass) disagree by ~3-6‰ between the two methods, exceeding the propagated analytical uncertainty of ~3‰ for low-intensity measurements. A systematic investigation of samples with natural Re isotopic composition (shale, molybdenite, and standard solutions) shows that use of anion exchange resin (column chemistry) may cause elevated $^{185}Re/^{187}Re$ ratios. This effect is