Tungsten isotope compositions of the Archean Anshan Complex, North China Craton and the oldest granites from the Barberton Greenstone Belt

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High precision W isotope measurements enable us to begin the high-resolution research for W isotopic compositions in ancient terrestrial rocks. W isotope compositions of three units of TTGs from the Archean Anshan Complex and the oldest granites from the Barberton Greenstone Belt were measured by MC-ICPMS. 3.8 Ga dioritic rocks at Anshan (NE China) show a resolved ^{182}W excess (~10 ppm) relative to the laboratory standards (or present-day mantle with $\mu^{182}W$ value of 0), whereas most of the 3.3 Ga and 3.1 Ga TTG rocks have no such excess with one exception sample (~3.3 Ga sample F28-2) that has a $\mu^{182}W$ value of 13 ± 3.2. Combined with the previously published ^{142}Nd data [1], our result suggests that the positive ^{182}W anomalies in the 3.8 Ga rocks are produced by early mantle differentiation that occurred within the lifetime of ^{182}Hf. A possible interpretation for the ^{182}W excess in the 3.3 Ga sample F28-2 is due to contamination by or inherited form an early-existed crust, such as the 3.8 Ga TTGs. The oldest preserved granitic rocks (sensu stricto), as conglomerates in the Moodies Group distributed in the Barberton Greenstone Belt, southern Africa, have $\mu^{182}W$ values of 2.7 ± 4.9, indistinguishable from the present-day mantle. It would provide further constraints on the petrogenesis of the Archean potassic granites when more ^{182}W data of other igneous rocks (i.e., TTGs and amphibolites) in the Barberton Greenstone Belt are produced.

[1] C Li et al., 2017. Precambrian Research 301, 86-101