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Discovery of High Heat in Neo-Proterozoic Granites of Malani Igneous Suite at Binawas, Jodhpur District, Rajasthan, India

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Abstract

The Malani Igneous Suite show crust formation as late as in Neo-Proterozoic times, comprising pink and grey granites in the Binawas area of Jodhpur district, Rajasthan, India. This study reports the average heat generation value of 8.358 HGU (Heat Generation Unit) for granites, which is higher than the average value of 3.8 HGU for the continental crust. The heat required for the partial melting of upper mantle was largely provided by the exothermic reactions involved in the radioactive decay of unstable isotopes of U, Th and K. High heat production (HHP) granites are evolved alkaline granites that have higher contents of Th, U, K and total REEs. These rocks are partially responsible for crustal heat flow, where the concentration of uranium determined is twice the average continental crust. Thorium is still higher than U and K. The radioelement concentration (Ur) varies from 15.98 to 43.50 in the granites with an average of 24.498, which clearly indicates a 'hot crust'. Hence, the HHPgranites need to be explored for economic deposits of U, Th and other HFS elements.

Keywords: Rare Earth Element, HHP Granites, Malani Igneous Suite, Uranium deposit, Hot Crust.