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Genetic Link between Ilmenite and Kimberlite: Constrain from Ilmenite Compositions of Majhgawan Kimberlite Pipe, Panna, Madhya Pradesh

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Abstract: *We present, major element geochemical data for ilmenite grains obtained from heavy mineral concentrate of diamondiferous Majhgawan kimberlite clan diatreme in Central Indian Diamond Province (CIDP) in Panna District of Madhya Pradesh, India. The chemical composition of 148 ilmenite grains suggests different compositional trends when plotted over "Haggerty's parabola" and as seen in MgO-Cr2O3 bivariant plots. The study indicates that the ilmenite crystallized in three stages: the first stage where Cr - poor ilmenite is crystallized from protokimberlitic or kimberlitic melt and forms the base of Haggerty's parabola on MgO-Cr2O3 plots; the second stage ilmenite is rich in MgO and Cr2O3 - represented by left branch of Haggerty's parabola-might have formed by interaction between melt and lithosphere; the third stage ilmenite is formed by sub-solidus recrystallization in an evolved kimberlite melt due to oxidation and is reflected in the right branch of Haggerty's parabola in MgO-Cr2O3 plots. The various trends in the ilmenite composition from Majhgawan pipe are attributed to conditions prevailing during ilmenite crystallization in a kimberlite melt ascending through the lithospheric mantle. These geochemical features indicate a genetic link between ilmenite and the host kimberlite melt.*

Keywords: Ilmenite and Kimberlite

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