

DISCOVERY OF PRIMARY SOURCE ROCKS FOR DIAMONDS IN CHHATARPUR DISTRICT, MADHYA PRADESH, INDIA

Abhijeet Mukherjee¹, Chandra Bhushan Verma^{1*}, Ram Raj Mathur², E.V.S.S.K. Babu³, Varun Kumar Mishra¹, Nikhil Kumar Sarwate¹, Manas Ranjan Mahanta¹ and Rakesh Kumar Jaiswal¹

¹NMDC Limited, Khanij Bhavan, Castle Hills, Hyderabad, Telangana

²Centre for Exploration Geophysics, Osmania University, Hyderabad, Telangana

³CSIR-National Geophysical Research Institute, Uppal Road, Hyderabad, Telangana

*Email: cbhushanji@gmail.com

Abstract

Exploration for mantle-derived small-volume ultrapotassic rocks such as kimberlites and lamproites involves multiparametric surveys involving both space- and ground-based geophysics, stream sediment sampling for indicator minerals and their analysis as well as exploratory drilling of anomalous zones. A combination of EIGEN 6 C4 GRACE & GOCE data (Kumar et al., 2020), aeromagnetic data (300 m spacing, 80 mGAL), soil sampling, stream sediment sampling, microscopic sorting and Electron Probe Micro Analysis studies of Kimberlitic Indicator Minerals (KIMs), ground geophysical surveys viz., magnetic, gravity and VLF EM yielded several anomalies from the Central Indian Diamond Province (CIDP) in parts of Damoh and Chhatarpur blocks of the state of Madhya Pradesh, India. Exploratory drilling of anomalous zones yielded a tuffisitic to hypabyssal tuffisitic highly altered kimberlite/lamproite. Heavy indicator minerals were dominated by chromites with a majority falling in the 'diamond stability field'. Exploratory drilling of anomalous zones has yielded a tuffisitic to hypabyssal tuffisitic lamproite. Petrographic studies of these lamproites indicate incipient alteration of primary minerals with high abundance of calcite. However, rare presence of chrome-spinel grains was observed. Chemistry of these grains suggest that they were derived from the diamond-window of the underlying lithosphere.

Keywords: Diamonds, Chhatarpur, Madhya Pradesh, Kimberlitic Indicator Minerals (KIMs), Central Indian Diamond Province (CIDP), Lithosphere