

# A NOTE ON DISCOVERY OF MICRODIAMONDS IN STREAM SEDIMENT SAMPLES OF GABBUR BLOCK, RAICHUR DISTRICT, KARNATAKA, INDIA

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Four mono-crystalline microdiamonds crystals were discovered in stream sediment samples collected during “Reconnaissance survey to locate *Kimberlite-Clan-Rock (KCR)* in Gabbur block, Raichur district, Karnataka,” (M2APMM-MEP/NC/SR/SU-KG/2017/12016), FS 2017-18 by Smt. Hema Wagh, Shri Prashant Wagh, Shri Laxmi Nandan Deori, and Shri Shashikant Gawade, Senior Geologists, SU: K&G, Bengaluru. Three microdiamond grains were recovered from 0.3mm to 0.5mm size fraction and one from 0.5mm to 1mm size fraction. These grains were studied in detail under the binocular microscope at 11X zoom and were confirmed using the FTIR-ATR method in FTIR Lab, NCEGR, Bengaluru. These crystals are colorless, pale, honey yellow to deep yellow in colour with brilliant adamantine luster and intense internal reflection. The yellow colour of diamonds are owing to the nitrogen impurities in them. They show octahedral (fig. 1-3) or dodecahedral crystal habit (fig. 4) with perfect four directional cleavages. Trigons and rounded crystal faces are a result of resorption process acted upon these crystals during its journey to the earth surface or erosion in the stream channel. Numerous growth layers/ steps on the surface of grain imply the slow development of the crystal in stable environment. Characteristic features like internal inclusion, ruts (deep etch channel and grooves), corrosion sculptures and shallow surface pits are also noticed in them. Conchoidal fracture and cleavage plane are observed in all microdiamonds.

The FTIR-ATR spectrum of microdiamond 2 (fig. 5) shows a broad absorption peak at  $1979.13\text{ cm}^{-1}$ ,  $2020.43\text{ cm}^{-1}$  and  $2159.14\text{ cm}^{-1}$  which matches with the intrinsic diamond absorption features ( $1800\text{ cm}^{-1}$  to  $2700\text{ cm}^{-1}$ ). Absorption peaks at  $1077.64\text{ cm}^{-1}$ ,  $1338.89\text{ cm}^{-1}$  and  $1540.90\text{ cm}^{-1}$  are due to nitrogen ( $1000\text{ cm}^{-1}$  to  $1400\text{ cm}^{-1}$ ) indicating presence of nitrogen impurities. The FTIR absorption spectrum for microdiamonds suggests they can be classified into Type- Ia Diamond class where nitrogen is present in A-, B-, N3 centre or platelets in form of impurities. It is also supported by the colour of the microdiamonds mainly pale yellow, honey yellow to light brown.

Most of the heavy minerals recovered are non-kimberlitic and of crustal origin and include amphibole, pyroxene, ilmenite, spinel, tourmaline, zircon and epidote. Kimberlitic Indicator Minerals (KIMs) like pyrope garnets, spinel, ilmenite and phlogophite mica were also found in the stream sediment samples collected from the study area. However, the composition of these KIMs has to be confirmed by EPMA analysis.



Fig. 1



Fig. 2



Fig. 3

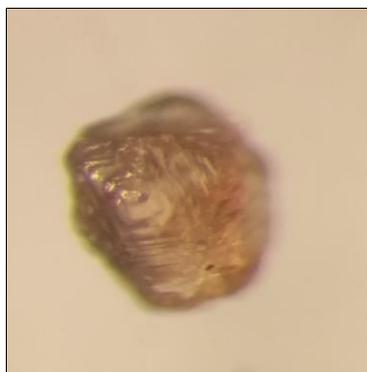


Fig. 4

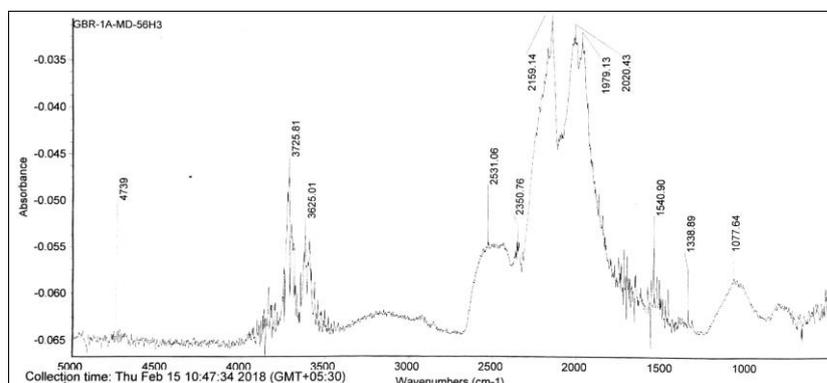


Fig. 5

Fig. 1. to Fig. 4. Microdiamonds (top view) under 11x zoom under microscope (size fraction 0.3mm-0.5mm). Fig. 5. FTIR-ATR spectrum of Microdiamond 2.