Spectroscopy of the brazilian diamonds

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Collection of diamonds from the river Macaubas basin (state Minas Gerais) includes 122 crystals. 17 % of crystals have curvilinear surface of the primary dissolving, 65 % of crystals have the post-regeneration relief with curvilinear surface of secondary dissolving, and 18 % of crystals bear indices of mechanical erosion. The river Macaubas diamonds are uniformly distributed by total nitrogen concentration ($N = N_A + N_{B1}$) and nitrogen aggregation stage (% *B*1). There were not revealed any significant differences between selections of crystals from different spots along the river Macaubas. Despite the wide variations of defined parameters, no isolated groups of crystals were detected also. Their part with the % *B*1 value more than 90 % is 0.12, and with the value lesser than 20 % - 0.13; the average value of this parameter is 50 %. Share of crystals with *N* lesser than 100 ppm makes 24 %, crystals with *N* more than 600 ppm - 35 %, the mean value of this parameter fixed at 500 ppm. The average coefficient of the platelets absorption band α_{B2}) for this selection is 6.8 cm^{-1}, the average value of the band maximum position is 1366 cm^{-1}, the absorption coefficient of the band 3107 cm^{-1} is 0.5 cm^{-1}; for crystals with high aggregation stage the same parameters make 18.5 cm^{-1}, 1364.5 cm^{-1} and 1.2 cm^{-1}. Among crystals with high aggregation degree, the high nitrogen-containing ones are characterised by the proportionality N_{B1} and N_{B2}. In the low-nitrogen crystals the *B*2 *IR*-band is absent or, if present, is quate below its possible value. Also was investigated collection of diamonds from Juina area (state Mato Grossu). It includes 55 crystals of –2 + 1 mm size. They are represented by chips and splinters with fragments of rounded natural surface (18 %), by rounded chips and splinters (14 %), fresh splinters (24 %), rounded intergrowths and polycrystals saturated with gray inclusions (44 %). Collection from Juina area, as compared with diamonds from the Macaubas river, contains a bit more of crystals with high degree of aggregation (34 %), 10 % of specimens have the low aggregation degree, and the remaining part of selection is quite uniformly distributed by this parameter, with its mean value 65 %. The average C_N value is 390 ppm, the share of crystals with *N* lesser than 100 ppm is 36 %. Obtained results for diamonds from Juina area differs from data published about any known sources of this region, firstly — by the greater *N* value, secondly — by the presence of significant amount of crystals with low and intermediate degree of the nitrogen aggregation, corresponding, in traditional interpretation, to temperatures 1100—1150 °C. Comparison of new data on the Macaubas river diamonds with results of previous investigations shows the greater values of the nitrogen aggregation degrees (17 and 50 %) and the higher average concentrations of nitrogen (370 and 500 ppm). The newly-obtained data indicate that in alluvial placers of Juina area there are not only diamonds with high and intermediate value of nitrogen aggregation degree, but also there are the relatively "low-temperature" crystals. It means the polygenetic nature of diamonds in Juina area and river Macaubas basin.