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# 1 Using of monomineral thermebarometry for diamond inclusions

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Interlinked methods of the monomineral thermobarometry – Opx (Brey Kohler. –Mc Gregor, 1974 ) ? CPx (Nimis – Taylor, 2000 - Ashchepkov .2003) Garnet (Ashchepkov Vishnyakova, 2004); Spinel (Ashchepkov Vishnyakova, 2005) were used to calculate the TP parameters for the mineral inclusions in the diamonds. The data set of 1000 published analyses () Lithos v.77 etc was used to determine the PT conditions of the diamond crystallization.

The minerals give rather different PT intervals. Pyrope garnets determine mainly the cold part at the basement of the lithosphere near the 35 mv/m2. They are characterize the growth diamonds in the giant grained dunite harzburgites originated by the subduction related melts generated by fluid flow derived mainly from the submerged continental blocks judging by the high LILE content of the minerals from depleted associations. The hotter (to 1400 at 50-65 (kbar) interval conditions for the Ti – rich associations reflect the heating near the protokimberlite magmatic system. Orthopyroxene thermobarometry gives different clots varying between the cratons. Most cold conditions coinciding with the cold garnet fields are determined for Fennoscandia, Slave craton, Australia? For Siberia the amount of hot PT values 40- 55 kbars dom-

inate corresponding mainly to pyroxenites. For South Africa determined TP conditions near 40 -45 mv/m2 sometimes are extending to 30 kbar and less. Clinopyroxene TP values for diamond inclusions from Africa craton are essentially hotter. But for Fennoscandia CPx's TP conditions are rather cold. In Africa diamond inclusions for the clinopyroxenes reflect rather hot branch as well as for Australia? But the later give very low values (20-40 êáàð) for Bingara. He newly developed Cr-spinel thermobarometry everywhere give the PT values plotting at the convective branch / For Slave craton it give 5 separate groups at the basement of the craton. Similar conditions were determined for South Africa but with less separate clots. For Siberia additional hot branch near 50 kbar is found.

Thus the most ancient kimberlites and cratonic peridotite associations give the colder conditions. The Gondwana groups of the continents like Africa show the more hot TP values of the diamond crystallization with the higher amount of pyroxenitic assemblages.

It should be noted rather high amount of the PT points plotting under the line of the diamond stability what together with the presence of some low pressure phases like plagioclase, serpentine etc may suppose the metastable crystallization at the upper level of mantle or what is more probable the growth of the inner parts of the diamond crystals directly in the kimberlite or protokimberlite magma which keep the conditions of the lower horizons due to hydrostatic paradox or other reasons/ This may explain the origin of the polymict inclusions on diamonds with the different lithology.

Conclusions of the monomineral thermobarometry explain the high amount of high quality diamonds at the hot Gondwana and especially Africa mantle and may predict rather low productivity of the Feenoscandia with the diamonds of peridotitic affinity. Of course this should be corrected to the lack of the good PT data for the eclogitic associations which dominate among the diamond inclusions in many places.

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