The estimation of diamond content of diamond-bearing dolomite marble from Kumdy-kol area in Kokchetav massif

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In the nine thin section of diamond-bearing dolomite marble from the Kumdy-Kol area in the Kokchetav UHP (ultrahigh-pressure) terrene, 4458 grains of microdiamond were counted up accurately by using an optical microscope. Until now the diamond content in dolomite marble in Kumdy-Kol has being quoted from A. Zajachkovsky and N.Dobresov, pers. comm. (1997 and 1998). They could get over 1000 carat per ton by crashed whole rock. We tried to obtain the other diamond content in dolomite marble by the count of microdiamonds. According to mode composition, the count of microdiamonds in a grain of garnet is converted into carat per ton in dolomite marble.

The result was calculated as 2700 c/t.

Carbonate rocks from the Kumdy-Kol area in the Kokchetav Massif give us interesting information of UHP. Carbonate rocks have been described for Dolomite marble, dolomitic marble and calcite marble by Ogasawara et al. (1998b) and Fukasawa et al. (2000). These rocks are considered to have subducted to more 210km depth (Fukasawa. et al).

In particularly diamond-bearing dolomite marble is good known for abundant microdiamond. Microdiamond in carbonate rock from Kumdy-Kol area was discovered by Sobolev and Shatsky, 1990

Principal constituent minerals in diamond-bearing dolomite marble are dolomite (60%), garnet (10%), diopside (10%) phlogopite (15%), tremolite (<5%) and talc (<5%), with Mg-calcite, microdiamond, graphite, rutile and phengite. This rock shows glanoblastic texture of dolomite, garnet and diopside.

Microdiamond occurs as inclusion mainly in garnet, and somewhat in diopside, phlogopite (after garnet). In nine thin sections of diamond-bearing dolomite marble, 4458 grains of microdiamond were counted up accurately by using an optical microscope. In most concentrated part, 2301 grains of microdiamond were found in just one grain of garnet and surrounding phlogopite on thin section. The brakdown of it is 1465 grains in garnet, 841 grains in surrounding phlogopite. These microdiamond has several features. The size of microdiamond is relatively smaller than other microdiamond before recognized, which measures 3 to 20 maicro meter in diameter (average 9.76maicro meter), and the transparency of those is generally higher than others. The rule of distribution was not confirmed. These microdiamond also occur in surrounding phlogopite, and there is no difference of morphology, distribution, and frequency from in garnet. This phlogopite is considered to be after garnet. These microdiamond is supposed to be precipitated from fluid under UHP.

Until now the diamond content in dolomite marble in Kumdy-Kol has being quoted from A. Zajachkovsky and N.Dobresov, pers. comm. (1997 and 1998). They could get over 1000 carat per ton by crashed whole rock. We tried to obtain the other diamond content in diamond-bearing dolomite marble by the count of microdiamond. At fast we calculated the volume of the garnet contains many microdiamond on thin section, and converted it into carat per ton in diamond-bearing dolomite marble according to mode composition.

The result was calculated as 2700 c/t. Generally diamond contents of ore like Kimberlite mine and placer deposit is 0.05 to 1 c/t, therefore this diamond content in dolomite marble in the Kumdy-Kol are is extremely higher than any other place in the world.