Inclusions in diamond polycrystalline aggregates, borts, from kimberlite of East China

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Although the data on mineral inclusions in a single crystals of natural diamonds are abundant in literature, inclusions in polycrystalline diamond aggregates, borts, are still poorly characterized.

In this work microinclusions in 5 samples of bort from the kimberlite pipe Shenly in East China were investigated using Scanning Electron Microscope JEM-5300 equiped with the energy dispersive spectrometer Link ISIS.

Dark-grey and brown-grey diamond aggregates, 1-2 mm in size, consisted of microcrystals with characteristic anti-skeletal growth form of octahedral facets, that shape dodecahedral habit. Some samples revealed also features of post-growth dissolution and plastic deformation.

In all the samples studied inclusions of native iron and sulphides - gersdorffite (NiAsS), polydymite (Ni_3S_4), or sieginite ($(Co, Ni)_3S_4$) - were revealed. In three aggregates, iron-chromium alloy and, in one, native lead were found. In diamond single crystals, inclusions of sulphide, often assosiated with native iron, are most common. While among sulphide in single crystals, pentlandite, pyrrhotite, and Fe-Ni monosulphide solid solution are widespreaded.

In some of the bort samples, inclusions of olivine, apatite, Fe-phlogopite, K-feldspar, barite, and lizardite were also detected. Barite and lizardite seems to be of epigenetic origin. All these inclusions exept barite are known in diamond single crystals too.

The occurence of inclusions revealed in the diamond aggregates could be understood from the viewpoint of diamond formation in the process of interactions between reduced sulphur-bearing fluids with subcontinental mantle (Taylor & Green, 1989; Deines & Harris, 1995).

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