

DISTRIBUTION OF IMPACT DIAMONDS IN THE RIES CRATER, GERMANY. R. T. Schmitt, M. Siebenschock and D. Stöffler, Institut für Mineralogie, Museum für Naturkunde, Invalidenstr. 43, D-10115 Berlin, Germany (ralf-thomas.schmitt@rz.hu-berlin.de).

Impact diamonds are known from the Ries crater, Germany (24 km diameter) since the study of [1]. In the last years impact diamonds were investigated in the Ries crater by several groups [2-9]. They were found in suevite whole rock samples [3, 5, 8-9], glass bombs [1, 4, 7] and highly shocked fragments of the suevite [2, 6]. This systematic study presents preliminary results on the distribution of impact diamonds in the Ries crater.

For the separation of diamonds acid dissolution techniques with HF-HCl solutions were used on crushed and homogenized samples of 30-50 g. Contamination by industrial diamonds were eliminated by avoiding sawing and cutting procedures during the separation.

For the study 94 surface samples of various outcrops were investigated: 2 lithic breccias („Bunte Breccie“), 7 suevites, 2 impact melt breccias, 42 metamorphic rock fragments from the suevite (4 samples of shock stage SO-SI, 10 of shock stage SII and 28 of shock stage SIII [10]), 19 magmatic rock fragments from the suevite (3 samples of shock stage SII, 16 of shock stage SIII), 18 glass bombs (shock stage SIV) from the suevite and 4 metamorphic rock fragments (shock stage SIII) from the impact melt breccia. Impact diamonds were found in 4 suevite samples (Hohenaltheim, glass rich and glass poor suevite of Seelbronn, dyke suevite of Unterwilfingen [9]), one metamorphic rock fragment (shock stage SIII) from the suevite (Seelbronn [6]) and 10 glass bombs from the suevite (Altebürg, Aumühle [7], Hainsfarth, Heerhof, Otting, Seelbronn [7], Unterwilfingen, Zipplingen [7]).

Additional 25 samples of the drill core Nördlingen 1973 [11] are under investigation: 13 samples from the crater suevite and 12 samples from lithic breccia dykes. So far impact diamonds could only be detected in one sample of the glass poor crater suevite (depth 586,30 m).

Independent of their source impact diamonds show identical appearance as reported previously [6-7, 9]: They occur as polycrystalline aggregates, reach sizes up to 300 µm and their colour varies from colourless-yellowish and green to grayish-black. Under the optical microscope they are transparent and show birefringence. They appear in pseudo-hexagonal plates and show parallel intergrowth of platelets as a common morphological feature. Some platelets show Veselov-

ski twinning. Vary rarely xenomorphic diamond grains were observed.

In the Ries crater impact diamonds were only observed in suevite whole rock samples or components of the suevite. Lithic breccias and impact melt breccias do not contain impact diamonds. No preferably regional distribution of impact diamonds in the fallout suevite could be detected so far. The study shows that the main carrier of diamonds in the Ries crater are glass bombs of the fallout suevite, formed by melting at shock pressures above 60 GPa [12]. The source of impact diamonds seems to be highly shocked graphite-bearing gneisses. Estimated concentrations of impact diamonds for the diamond containing samples varies between 0.06 and 0.7 ppm. The crater suevite contains also impact diamonds, but the concentration of diamonds seems to be much lower than in the fallout suevite.

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