

## **NATURAL SHOCK METAMORPHISM OF GARNET- AND GRAPHITE-BEARING GNEISSES FROM THE RIES CRATER, GERMANY**

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The recent detection of diamonds in graphite-bearing gneisses from the Ries crater has triggered new studies of impact-related phenomena. The present investigations with micro-laser Raman spectroscopy are based on a large suite of variably shocked garnet-bearing gneisses. The shocked clasts predominantly come from the fall-out suevites of Alteburg, Aumühle, Otting and Zipplingen. Shocked almandite is characterized by a closely spaced network of planar fractures mostly oriented parallel {111} and {100}. At higher post-shock temperatures garnets become brownish and break down to orthopyroxene, spinel and glass. The newly found dense SiO<sub>2</sub> glass inclusions with expansion fractures in the host garnets present stringent constraints in estimating the minimum peak-shock pressures. Cordierite transforms to a diaplectic cordierite glass followed by a vesicular melt glass to higher shock states. Pre-shocked 'pinitic' alteration products of cordierite seem to be less pressure sensitive but change to brownish isotropic masses with increasing post-shock temperatures. Sillimanite is characterized by fine sets of planar elements with different orientations. Only graphite leafs adjusted parallel to the propagating shock wave are severely kinked. The accessories ilmenite, rutile, apatite, zircon, monazite and spinel show in part shock-related features.