

Crystallization condition and magma evolution for the early Permian Planitz vitrophyre, Chemnitz-Basin, eastern Germany

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The Planitz vitrophyre is assumed to form part of the Rochlitz-Ignimbrite, an extensively distributed Late Paleozoic volcanic unit in Saxony (Germany). For the first time, we present an interpretation in glass and mineral chemistry (electron microprobe and mineral liberation analysis) of the pyroxene-bearing vitrophyre.

Glomerophytic textures and two differently coloured types of volcanic glass (80 vol.-%) of andesitic and rhyodacitic composition suggest magma mingling processes. This is confirmed by the occurrence of mineral zonation like bytownite core rimed by andesine in plagioclase. Pyroxene has augite core rimed by enstatite-ferrosilite. Moreover, we detected unzoned pyroxene, biotite with an annite composition; kalifeldspar reveals sanidine to Na-sanidine composition.

The mineralogical results were used for calculation of pyroxene and feldspar geothermo- and barometry to reconstruct crystallization temperature and pressure. The crystallization temperatures for pyroxene range between 951 °C and 839 °C and between 727,79 °C and 929,75 °C for feldspar. The depth of the magma chamber estimated between 21 and 28 km.