

Quartz - K-feldspar intergrowths enclosed in eclogitic garnet and omphacite. Are they pseudomorphs after coesite?

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According to our observations on rock samples from the Dora Maira Massif and the Dabie Shan containing relics of coesite (Cs), this mineral transforms only to quartz (Qz). Thus, it is a surprise that inclusions in omphacite (Omph) and garnet (Gt) have been considered by other investigators as pseudomorphs after Cs although they consist of discernible amounts of K-feldspar (Kf) in addition to Qz. Only the impressive cracks in the host minerals around such inclusions are similar for both inclusion types.

We have investigated the questionable type of inclusion that appears in eclogites of the Gneiss-Eclogite Unit of the Erzgebirge where Gt peridotite and diamondiferous gneiss prove an ultrahigh-pressure (UHP) metamorphic nature at least of parts of this unit. The ideal shape of such inclusions that can be observed in both Omph and Gt is a pseudo-hexagonal plate. Our SEM studies demonstrate that these inclusions are now symplectites that consist of Qz and minor but significant amounts of Kf. In contact with the Gt host, micas and chlorite have formed at the expense of Kf. The inclusions can even consist of two or more generations of symplectites showing increasing grain size towards the center.

The shape and the textures of the inclusions point to a former solid phase rather than to a silicate melt, but we believe that neither a transformed pure SiO₂ phase nor exsolution from Si-rich UHP Omph (Yang et al. 1998) is the right interpretation. However, K-bearing Cs has so far not reported from HP experiments nor has a phase between SiO₂ and Kf composition. Nevertheless, we think the observations point to a phase that forms at UHP.