Nanometer-size syngenetic fluid/melt inclusions in microdiamonds from various ultrahigh-pressure rocks: Diversified characteristics of the formation media of metamorphic microdiamond due to host-rock buffering

黃士龍（東華大學），朱傚祖（中央地質調查所），沈博彥（中山大學），俞震甫（中央研究院）

Abstract

Nanometer-size fluid/melt inclusions were identified within metamorphic microdiamonds from garnets of ultrahigh-pressure (UHP) rocks of the Kokchetav and the Erzgebirge massifs by analytical electron microscopy. The chemical characteristics of the K/P-rich SiO_2-glass inclusions within microdiamonds are surprisingly similar among various gneissic rocks from both Kokchetav and Erzgebirge, but are significantly different from the SiO_2-poor ultrapotassic fluid inclusions within microdiamonds from garnets of the Kokchetav UHP marble. These contrasting findings not only provide constraints on the characteristics/compositions of the formation media of metamorphic microdiamonds, but also imply that the formation media must have been buffered by the hosting rocks, resulting in the observed diversities as reported here. In addition, depending on the rock types and thus on the nature of the formation media from which metamorphic microdiamonds were formed, the respective characteristic morphologies of the microdiamonds differ. The P/K-rich silica melt tends to form octahedral or cubo-octahedral microdiamonds within garnet in gneissic rocks, whereas the SiO_2-poor ultrapotassic fluid tends to form spheroids/cuboid microdiamonds with rugged surfaces within garnet in marble. Consequently, the buffered media in hosting rocks played a decisive role in determining the different morphologies and growth rates/mechanisms of metamorphic microdiamonds in general.