NANOMETER-SIZE SILICA-RICH GLASS INCLUSIONS IN MICRODIAMOND FROM GNEISSES OF KOKCHETAV AND ERZGEBIRGE MASSIFS: DIVERSIFIED CHARACTERISTICS OF THE FORMATION MEDIA OF METAMORPHIC MICRODIAMOND IN UHP ROCKS

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Nanometer-size silica-rich glass inclusions, as well as silica-poor/potassium-rich fluid inclusions were observed within metamorphic microdiamonds in garnet from the Kokchetav and Erzgebirge ultrahigh-pressure rocks. The chemical characteristics of these inclusions, and thus the diamond formation media, differ significantly depending on the respective host rock acting as a buffer. Whereas glass inclusions from garnet-biotite gneisses from the Kokchetav and Erzgebirge massifs generally are high in Si, K, P, Cl, fluid/melt pockets within diamonds from garnet-quartz-clinopyroxene rocks from Kokchetav are K-rich and Si-poor. Ultrapotassic fluid inclusions within diamonds of dolomite marble from Kokchetav typically are extremely poor in Si. Above all, fluid/melt inclusions within metamorphic diamonds also show chemical differences from those within the mantle-derived diamonds.

Depending on the different compositions of the fluid/melt media from which metamorphic diamonds were formed, the morphology of the microdiamonds also differs typically. Consequently, the fluid/melt medium responsible for the metamorphic microdiamond growth has been most probably generated within its own respective host rock. The nature and composition of this medium might play a decisive role in determining the different morphologies and growth rates/mechanisms of metamorphic diamonds in general.