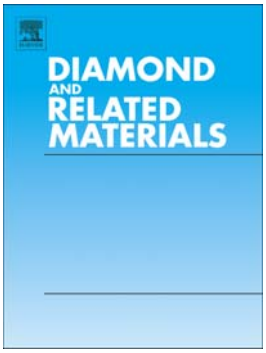

Finite element design of a temperature field for high-pressure diamond synthesis

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Finite element design of a temperature field for high-pressure diamond synthesis

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Abstract

The temperature field in a high-pressure synthetic cavity for diamond production is optimized by adjusting the cavity assembly. This paper aims to propose design rules for high-pressure cavity assembly and apply finite element simulation for analysis. Three assemblies, namely, conventional, D1, and D2, are presented and compared. The temperature field of each assembly is visualized via the finite element method. High-pressure experiments are then performed in a diamond synthesis factory. Compared with conventional assembly, D1 and D2 assemblies established on the basis of the proposed design rules can improve the conditions for diamond synthesis.

Keywords: Finite element design; Diamond synthesis; High-pressure cavity assembly; Temperature distribution