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Post-HIPing of Transparent Polycrystalline Alumina Ceramics Prepared by Pulsed Electric Current Sintering

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Transparent polycrystalline alumina (TPA) ceramics have been used in optical devices such as optical windows and high efficiency lumps. They have been produced with sintering process with advanced fine alumina powder. Pulsed electric current sintering (PECS), which is also so-called spark plasma sintering (SPS), is useful for producing TPA ceramics. However, transparency of TPA ceramics produced by using PECS is still lower than the single crystalline alumina. As well, carbon contamination in TPA ceramics makes darker in color. Heat treatments in air for TPA ceramics decreases their transparency. This phenomenon is explained as formation of microscopic cracks by heat treatments. Because hot isostatic process (HIP) is useful to remove fine closed pores in sintered materials with closed pores, HIP may be effective to increase transparency of TPA produced by PECS. In the present report, post-HIPing process of TPA ceramics produced with PECS was described.

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Materials

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