

Processing optimization of highly translucent un-doped and Nd³⁺-doped cubic BaLaLiWO₆ ceramics *via* LiF-assisted Spark Plasma Sintering

Autorzy

K. A. Prokop

S. Cottrino

V. Garnier

G. Fantozzi

Y. Guyot

G. Boulon

M. Guzik

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Streszczenie

In recent years, materials science has increasingly focused on developing novel rare-earth -doped inorganic compounds to fabricate transparent optical ceramics. This work investigates cubic perovskite-type tungstates, BaLaLiWO₆, which have mainly been studied as powders or single crystals but not as transparent ceramics. First, highly translucent ceramics, un-doped and 1% Nd³⁺ - doped, were fabricated using Spark Plasma Sintering (SPS). The influence of LiF as a sintering aid was examined. Then the materials were characterized by XRD, SEM, and total forward transmission (TFT) measurements. In result, un-doped BaLaLiWO₆ ceramics (1mm thick) showed up to 45% transmittance at 850nm, while Nd³⁺-doped sample reached about 35% under optimized conditions. Spectroscopic analysis revealed broad absorption and emission bands in Nd³⁺-doped ceramics, indicating strong potential as gain media for high-power pulsed lasers. These findings support further development of high-quality transparent optical ceramics.

Słowa kluczowe

perovskite oxides, Nd³⁺ doping, Spark Plasma Sintering,
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