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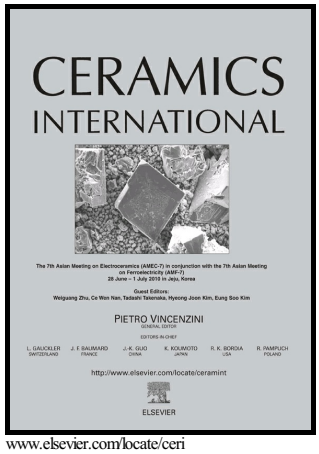

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Densification and microstructure evolution of reactively sintered transparent spinel ceramics

Dan Han [a, b], Jian Zhang [a, c*], Peng Liu [d], Gui Li [a], Shiwei Wang [a, c*]

[a] Key Laboratory of Transparent Opto-functional Inorganic Materials, Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai, 200050, P.R. China

[b] University of Chinese Academy of Sciences, Beijing 100049, China

[c] The State Key Lab of High Performance Ceramics and Surperfine Microstructure, Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai, 200050, P.R. China

[d] School of Physics and Electronics Engineering, Jiangsu Normal University, Xuzhou, 221116, P.R. China

**Corresponding author*: *jianzhang@mail.sic.ac.cn; swwang51@mail.sic.ac.cn*

Abstract

Reactive sintering is an effective and simple method to prepare transparent spinel ceramics. In this research, transparent $MgO{\cdot}nAl_2O_3$ ($0.98 \leq n \leq 2$) spinel ceramics were prepared via reactive sintering in air followed by hot isostatic press (HIP), using MgO and γ-Al_2O_3 powders as raw materials. The influence of composition on densification and microstructure evolution was systemically investigated. More importantly, the relationship between microstructure of presintered samples and final properties of transparent ceramics was singled out. Thermodynamically stable large pores were easily generated in magnesia-rich and stoichiometric samples after presintering in air, causing severe abnormal grain growth during the HIP treatment and poor optical quality of the resulting samples. The presintering temperature of alumina-rich samples