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Thermal evolution of lithium ion substituted cesium-based geopolymer under high temperature treatment, Part I: effects of holding temperature

Jingkun Yuan^{a,b}, Peigang He^{a,b*}, Xiaomin Liang^{a,b}, Dechang Jia^{a,b,c*}, Lingyu Jia^{a,b}, Delong Cai^{a,b}, Zhihua

Yang^{a,b,c}, Xiaoming Duan^{a,b,c}, Shengjin Wang^a, Yu Zhou^a

^aInstitute for Advanced Ceramics, School of Materials Science and Engineering, Harbin Institute of Technology, Heilongjiang, Harbin, 150080

^bKey Laboratory of Advanced Structure-Function Integrated Materials and Green Manufacturing Technology, Ministry of Industry and Information Technology, Heilongjiang, Harbin, 150080

^cState Key Laboratory of Advanced Welding and Joining, Harbin Institute of Technology, Heilongjiang, Harbin, 150080

peiganghe@hit.edu.cn

dcjia@hit.edu.cn

*Correspondent author: Peigang He, Dechang Jia. Address: School of Materials Science and Engineering, Harbin Institute of Technology, P. O. Box 433 Harbin 150001, P. R. China. Tel: +86 0451 86418792; Fax: +86 0451 86414291

Abstract

In this paper, a high temperature treatment procedure was designed to evaluate the effect of holding temperature on thermal evolution process of Li⁺ substituted Cs-based geopolymer (Cs_{0.7}Li_{0.3}GP), including the thermal analysis, phase composition and microstructure evolution. With rising of holding temperature, amorphous unheated Cs_{0.7}Li_{0.3}GP gradually transformed into a multiphase system during the high temperature treatment process, which consisted of pollucite (CsAlSi₂O₆), spodumene (LiAlSi₂O₆) and amorphous glass phase. In the multiphase system, Cs⁺ ions were in the form of pollucite grains, while Li⁺ ions were in the form of spodumene nanocrystallines distributed in amorphous matrix. The pollucite grains gradually coarsened with rise in holding temperature, and the densification of the resulting products were also improved synchronously, which were related to the presence of

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