化学学报 2007 65 (14): 1394—1398 ISSN: 0567-7351 CN: 31-1320/06

研究简报

P_2O_5对Li_2O-SiO_2-Al_2O_3-K_2O-ZnO体系微晶玻璃析晶性能的影响

刘晓秋*,[1], 宋文植[2], 王景云[1], 孙宏晨*,[1], 杨海滨*,[3], 邹广田[3], 欧阳喈[1]

([1]吉林大学口腔医学院 长春 130041)
([2]吉林大学中日联谊医院 长春 130031)
([3]吉林大学超硬材料重点实验室 长春 130012)

收稿日期 2006-12-29 修回日期 2007-4-3 网络版发布日期 2007-7-24 接受日期 2007-6-4

摘要 采用差热分析、X射线衍射及扫描电镜分析手段研究了P_2O_5对Li_2O-SiO_2-Al_2O_3-K_2O-ZnO体系牙科微晶玻璃析晶性能的影响, 并确定了P_2O_5的最适含量. 结果发现P_2O_5是该玻璃体系的有效成核剂, 未添加P_2O_5的玻璃体系成核密度低, 热处理后不能形成微晶体, 且主晶相为硅酸锂; 添加P_2O_5使玻璃在热处理后形成以二硅酸锂为主晶相的微晶玻璃. 该玻璃体系中添加4.5 wt%的P_2O_5可以得到较高体积含量和理想显微结构的牙科二硅酸锂微晶玻璃. P_2O_5含量为6 wt%的基质玻璃发生乳浊, 呈不透明的乳白色.

关键词 P_2O_5 微晶玻璃 析晶

分类号

Effect of P_2O_5 Addition on the Crystallization Properties of Li_2O-SiO_2-Al_2O_3-K_2O-ZnO Glass-Ceramic

LIU Xiao-Qiu*,[1], SONG Wen-Zhi[2], WANG Jing-Yun[1], SUN Hong-Chen*,[1], YANG Hai-Bin*,[3], ZOU Guang-Tian[3], OUYANG Jie[1]

([1] *School of Stomatology, Jilin University, Changchun 130041*)
([2] *China-Japan Union Hospital, Jilin University, Jilin University, Changchun 130031*)
([3] *National Laboratory of Superhard Materials, Jilin University, Changchun 130012*)

Abstract Differential Thermal Analyses (DTA), X-Ray Diffraction analyses (XRD) and Scanning Electron Microscopy (SEM) were used to study the effect of P_2O_5 addition on the crystallization properties of dental glass-ceramics in the Li_2O-SiO_2-Al_2O_3-K_2O-ZnO glass system. It was concluded that P_2O_5 was an effective nucleating agent for this glass system. The nucleation density of this glass system was too low to form tiny crystal after heat-treatment, when it contained no P_2O_5, and the major crystal phase was lithium silicate. Adding P_2O_5 resulted in major tiny crystal phase of lithium disilicate after heat-treatment. 4.5 wt% of P_2O_5 could give high content and prospecting SEM appearance of dental lithium disilicate glass-ceramic. 6.0 wt% of P_2O_5 opacified base glass.

Key words P_2O_5 glass-ceramics crystallization

DOI:

通讯作者 刘晓秋 liuxiaoqiu_2007@yahoo.com.cn