P-153

Machining property of Cobalt doped glass by using Nd:YAG(532nm) laser

김태호, 이규호, 김영석, 정영준, 진현주, 류봉기†

부산대학교 공과대학 재료공학부

(bkryu@pusan.ac.kr†)

Suitable glasses for laser micromaching using a Nd:YAG laser have been developed. The composition of glasses is (70-x)SiO2-xB2O3-10Na2O-10CaO (x=0, 10, 15, 20, 25, 30). These glasses contain the Co ions in glass matrix (adding to the mother glass). After machining with the 2nd harmonic beams of a pulsed Nd:YAG laser, the bump in the glass host, the pit at the bump in the glass host and the sole pit were(was) formed. This report was conducted for researching as for relationship between bonding intensity of glass and thermo-mechanical properties, and for finding out the possibility of the fabrication of micro lens array (MLA). The maximum height of bump in the glass was 16μm and a diameter was 262.3μm. We found that the Co ions acted as sensitizers in laser machining of the glasses and this process can be used for MLA fabrication process.

Keywords: Glass, Cobalt, Laser, Machining

P-154

Nucleation and Crystallization of SiO2-Na2O-CaO-P2O5 biological glass by Differential Thermal Analysis

김영석, 이규호, 정영준, 김태호, 류봉기†

부산대학교 재료공학과

(bkryu@pusan.ac.kr†)

Bioactive glasses of the system SiO2-Na2O-CaO-P2O5 have been prepared by melting and annealing technique. The nucleation and crystallization mechanisms of a 46Na2O-27CaO-25SiO2-2P2O5(mol%) glass was investigated by differential Thermal analysis (DTA) and X-ray diffraction analysis. The average activation energy for crystallization, E, was determined to be 143±10KJ/mol by the Kissinger method and 141±10KJ/mol by Augis-Bennett method. The Avrami constants were $1.02 \leq n \leq 1.2$, and it appeared one direction growth. A nucleation-rate-type curve was determined by plotting either the reciprocal of the temperature corresponding to the crystallization peak maximum, 1/TP, or the height of the crystallization peak, $(\delta T)p$, as a function of nucleation temperature, Tn. The temperature where nucleation can occur for this glass ranges from 550 to 620℃ and the temperature of maximum nucleation rate is at 600±10℃.

Keywords: Crystallization kinetics, Bioactive glass, Glass-ceramics, Surface nucleation