SnO$_2$-P$_2$O$_5$-B$_2$O$_3$ 유리구조 및 열적 특성

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**Abstract**: SnO$_2$-B$_2$O$_3$-P$_2$O$_5$ system were prepared by melt-quenching technique in the compositional series containing 50, 55 and 60mol.% of SnO$_2$. A large glass-forming region was found at the phosphate side of the ternary system with homogeneous glasses containing up to 5-25mol.% of B$_2$O$_3$. For these glasses, thermal expansion coefficient($a$), glass transition temperature($T_g$), and glass softening temperature($T_s$), were determined. The values $a$ decrease with increasing B$_2$O$_3$ content, while $T_g$ and $T_s$ increased. The reason for the observed changes is local structure of the glasses. Local structure of the glasses was investigated by Raman and FT-IR measurements, suggesting that the number of bridging oxygens decreased whereas the non-bridging oxygen concentration increased with increasing SnO$_2$ content in the glasses.

**Key Words**: Pb-free, SnO$_2$-B$_2$O$_3$-P$_2$O$_5$, low-transition temperature

- 91 -