

EXAFS study of sulfur-containing silicate and borate glasses

K. Yamamoto¹⁾, K. Handa²⁾, K. Kojima¹⁾, N. Wada³⁾,
T. Asahi⁴⁾ and K. Ozutsumi¹⁾

Abstract

Sulfur-containing silicate ($\text{Na}_2\text{S-SiO}_2$) and borate ($\text{Na}_2\text{S-B}_2\text{O}_3$) glasses were prepared by the ordinary melt-quenching method. Optical absorption and EXAFS spectra for the Si *K*-edge and S *K*-edge in these glasses were measured to investigate their local structure. In the $\text{Na}_2\text{S-SiO}_2$ glasses, S-Si bonding was observed, while S-S bonding was not observed. The interatomic distance of S-Si hardly varied as the Na_2S content increased. On the other hand, in the $\text{Na}_2\text{S-B}_2\text{O}_3$ glasses, S-B bonding was not observed, while S-S bonding was observed. The interatomic distance of S-S decreased with increasing the Na_2S content. This decrease may be caused by both an increase in the content of polysulfide ions S_x^{2-} ($x = 1 \sim 8$) and the effect of the structural transformation in the borate glass.

1) *Department of Applied Chemistry, Faculty of Science and Engineering, Ritsumeikan University, Kusatsu, Shiga 525-8577, Japan*

2) *SR Center, Ritsumeikan University, Kusatsu, Shiga 525-8577, Japan*

3) *Suzuka National College of Technology, Shiroko, Suzuka, Mie 510-0294, Japan*

4) *Niihama National College of Technology, Yagumo, Niihama, Ehime 792-8580, Japan*