

Role of non-metallic molecules in fused silica glasses

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Investigations of non-metallic molecules dissolved in fused silica glass network are indicating the important role of these species in glass preparation process and interaction with external influences. These molecules are also changing optical properties of glasses. Interstitial oxygen molecules in dry synthetic fused silica are playing important role in radiation processes ¹. By ionizing radiation from O₂ molecules interstitial ozone molecules are created and optical properties of material are changed ². Interstitial chlorine molecules are responsible for the 3,8 eV absorption. Hydrogen molecules dissolved in glass network were used to estimate the size of cavities in fused silica. Recent investigations on F₂ excimer laser irradiation influence on “wet” fused silica samples are indicating the possible creation of isolated water molecules in the glass network.

¹ L. Skuja, B. Gutter, D. Schiel and A. Silins; Infrared photoluminescence of pre – existing or radiation – induced interstitial oxygen molecules in glassy SiO₂ and quartz; Phys. Rev., 1998, **B 58**, pp.14296 – 14304.

² L. Skuja, M Hirano and H. Hosono; Oxygen – related intrinsic defects in glassy SiO₂. Interstitial ozone molecules; Phys. Rev. Lett., 2000, **84**, pp.302 – 305.