

Micron Pores in Vycor Porous Glass: Evidences from USANS

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The structure of Vycor Porous glass has been widely investigated before by neutron and X-ray small angle scattering in the range of scattering vectors $0.001 \text{ \AA}^{-1} < Q < 0.2 \text{ \AA}^{-1}$. Previous investigations were mostly concerned with studying the Vycor correlation peak at $Q \sim 0.25 \text{ \AA}^{-1}$ as well as pore surface properties in the high- Q region, and generally neglected an upturn in the scattering at $Q < 0.006 \text{ \AA}^{-1}$, which may be indicative of the availability of larger pores. We report the results of combined USANS and SANS studies of the structure of Vycor glass in the Q range $\sim 4 \times 10^{-6} < Q < 2 \times 10^{-1} \text{ \AA}^{-1}$ and demonstrate the existence of pores with dimensions of the order 8–10 micrometers in this porous matrix. We tentatively interpret the existence of the micrometer pores in Vycor as due to the late stages of spinodal decomposition during the manufacturing process. More systematic USANS studies are needed in order to determine the nature of large pores in Vycor.