## Anomalous Suppression of Superfluidity for $^4$He in Gelsil Glass

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Suppression of the superfluidity in nanometer-size pores has attracted the interest of researchers. We have studied the superfluid behavior for liquid $^4$He filled in a nanoporous glass, Gelsil, whose nominal pore size is 2.5 nm. First, we cut a cylindrical sample of Gelsil ($\phi$9 mm×L18 mm) into three pieces 2-3.5 mm in thickness, and examined the pore size distribution by measuring the $N_2$ adsorption isotherm. Then, we found that the ratio of surface area to pore volume (S/V) ranges from 2.0 to 2.4 $\mu$mol/m$^2$, depending on piece. The superfluid transition temperature around the saturation vapor pressure is 0.6 K for the piece with the smallest S/V ratio, and 1.4 K for the piece of the largest one. Furthermore, for the smallest S/V ratio, the suppression of superfluid transition by pressurization becomes weaker as the pressure is increased, which is different from the conventional pressure dependence observed in various nanoporous glasses. The results demonstrate that the suppression of superfluidity is strongly related to the pore size.