Desorption of Gasses Induced by Ferroelectric Transition in SbSI Nanowires

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Recently, sonochemically produced antimony sulfoiodide (SbSI) nanowires have been used as gas sensors. The investigated high-surface-area SbSI xerogel (fig. 1a) is made up of large quantity nanowires (fig. 1b) with diameters of about 10–50 nm and lengths reaching up to several micrometers and single crystalline in nature. Its ferroelectric phase transition have been observed at T_c=293(1) K. For the first time the thermal desorption of H_2, N_2, O_2 and CO_2 from SbSI nanowires has been observed near the Curie temperatures (fig. 2). A tentative explanation of these results is that the adsorption of gas molecules by the ferroelectric nanowires is due to a particular local electrostatic potential created by surface charges. Thus, the performed experiments explore the possibility of a dipole–dipole interaction between gas molecules and ferroelectric nanowires.

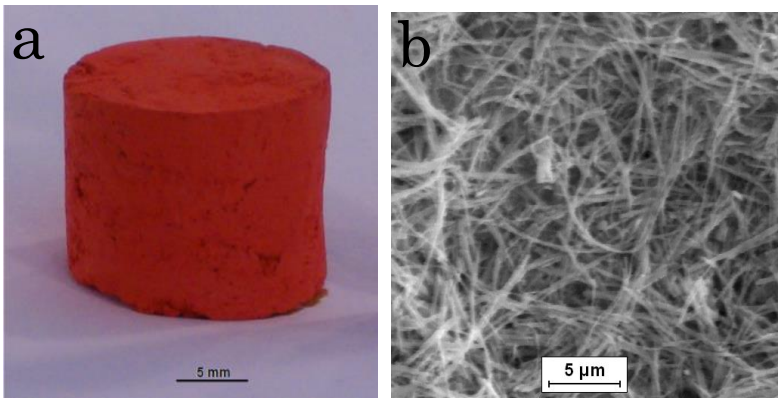

Fig. 1. Photo (a) and SEM (b) images of SbSI xerogel.

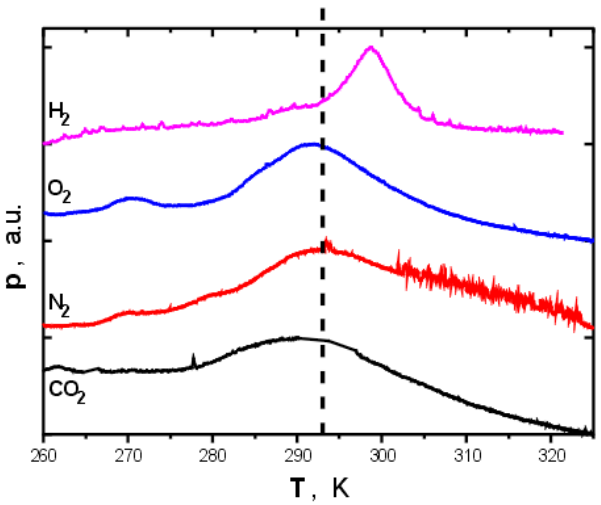

Fig. 2. Thermal desorption spectra obtained after dosing SbSI xerogel with different gasses. The vertical dashed line shows the temperature of ferroelectric transition in the investigated SbSI nanowires.

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