

Abstract: By controlling the process of sol-gel and parameters of charging, the charge storage stability of porous silica thin film electret based on silicon substrate was investigated by measuring isothermal surface potential decay and current spectra of open-circuit Thermally Stimulated Discharge (TSD). The relationships between these parameters were analyzed. Moreover, the energies of charge traps were evaluated by the initial-rise method after Gauss fitting. The result shows that the content of water in the solution of reactant has some influences on the charge traps distribution of sol-gel silica thin film. The evaluated activation energies of charge traps in sol-gel SiO<sub>2</sub> film electret are 0.3eV and 1.0eV, respectively. The influence of relative humidity on the charge storage stability of SiO<sub>2</sub> film electret was investigated. Decreasing the grid voltage during corona charging is another method to improve the charge storage stability for SiO<sub>2</sub> film electret.