Abstract: The influence of grid voltage on charge storage ability of porous polytetrafluoroethylene (PTFE) film electrets has been systematically studied by means of constant voltage corona charging with a grid, thermal pulse technique, open-circu it thermally stimulated discharge current spectra and monitoring the charging cu rrent through samples during the charging. The origin of the influence has been discussed by using the charge dynamic characteristic and microcosmic structure analysis of the materials. It was found that too high a grid voltage may lead to the declination of charge density deposited in the porous sample and enhance th e charge decay, and thus, to the decrease of piezoelectricity and thermal stabil ity of the porous film. For negatively corona charged porous PTFE, excellent cha rge storage ability can be performed at an optimal grid voltage, which will impr ove its piezoelectric activity in the application to the electret piezoelectric sensor film with dipolar space charges.