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Giant Dielectric in Sb-Single Doped Rutile-TiO₂ Ceramics

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Sb-single doped rutile-TiO₂ (STO) ceramics were prepared by a conventional mixed oxide method. The high-dielectric performance with giant dielectric constant value ($\epsilon' \approx 10^4$) with low dielectric loss ($\tan \delta < 0.05$) of STO ceramics over a wide temperature range were obtained. Scanning electron microscope coupled with energy-dispersive X-ray analysis (EDX) and X-ray diffraction technique were used to characterize the microstructure and crystal structure, respectively. The existence of Ti³⁺ was confirmed using X-ray photoelectron (XPS) technique. X-ray absorption near edge structure (XANES) technique were also carried out. The origin of the observed high-dielectric performance in STO ceramics was investigated.

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