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Titanate nanotubes-AgO nanocomposites: Synthesis, characterization, and dielectric properties

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The titanate nanotubes (TNTs) were synthesized by hydrothermal method and were composited with silver oxide nanoparticles (AgO) in various 1, 5, 10 wt.%. The prepared samples were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), energy dispersive X-ray microscopy (EDX), and ultraviolet-visible spectroscopy (UV-vis). The phases of TNTs and TNTs-Ag nanocomposites were confirmed by XRD and EDX results. The dielectric properties of TNTs-AgO were studied at different temperatures (-50 ℃ to 100 ℃) in the wide ranges of frequency (100 Hz to 1 MHz). The TNTs-AgO exhibited dielectric constant in the range of $10 - 10^4$ at frequency 1 kHz and 30 ℃. Moreover, the dielectric constants of TNTS significantly decrease with increasing Ag composition due to the increase in the conductivity in the sample causing the reduction of the dielectric properties of TNTs.

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