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# Classic Perovskite Ferroelectric BaTiO3 Ceramics Modified with Nanogold

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Perovskite barium titanate (BaTiO3) BT-based ceramics have been of interest as one of the promising smart materials in commercial electrical components due to their non-toxic and variable electrical properties for several decades. However, these BT-based ceramics suffer from high sintering temperature requirement, low dielectric constant and high dielectric loss, causing a limitation for their practical utilizations, especially for the multilayer ceramic capacitors with ultrathin layers. Therefore, several approaches have been introduced to minimize these limitations including a method of reinforcing the ferroelectric matrix with high electrical conducting phases. Apart from their environmental friendly, gold nanoparticles (AuNPs) are thought to be reasonable candidate used for shortening the electrode distance (i.e. leading to stronger effective electric filed in the dielectric phase) in nanometal/BT ceramics. Hence, composites of BT and AuNPs phases are expected to synergistically combine the properties of both the ferroelectric BT and the conductive AuNPs, which could exhibit dielectric properties that are better than those of the monolithic BT ceramics. Here we demonstrate that under suitable sintering condition and AuNPs content, both densification and dielectric properties of the composites with fine-grained microstructure fabricated in this work were significantly improved, as compared to the monolithic BT ceramics.

Keywords: Barium titanate; Gold nanoparticles; Sintering

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