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**Effects of adding HfO<sub>2</sub> on the microstructure and dielectric properties of giant dielectric constant ceramic CaCu<sub>3</sub>Ti<sub>4</sub>O<sub>12</sub>**<sup>1</sup> W.X. YUAN, S.K. HARK, The Chinese University of Hong Kong — CaCu<sub>3</sub>Ti<sub>4</sub>O<sub>12</sub> (CCTO), an unusual perovskite-like ceramic, is known for its extraordinarily high ( $\sim 10^4$ ) and relatively frequency independent dielectric constant. It has drawn a lot of attention recently because of its potential applications in microelectronics and microwave devices. In this investigation, HfO<sub>2</sub> powder was added to a pre-reacted CCTO powder, which was synthesized by a conventional solid-state reaction, at different concentrations from 1 to 70 wt% and the mixture was sintered into disc-shaped ceramic samples. The effects of adding HfO<sub>2</sub> on the microstructure and dielectric properties of CCTO ceramics were investigated. In general, we found that the dielectric constant tends to increase with HfO<sub>2</sub> addition up to 8 wt% and then decrease with further addition. Moreover, the dielectric loss was also influenced by the addition of HfO<sub>2</sub>, and a low loss tangent of  $\sim 0.035$  was obtained. The ac conductivity, impedance, complex dielectric permittivity and electric modulus graphs were used to analyze the data. These observations were explained on the basis of the internal-barrier-layer capacitor model with Maxwell-Wagner relaxations.

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