

Coating of Nano-thin BaTiO₃ Layer on Spherical Ni Powders for Multilayer Ceramic Capacitors

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Abstract

Currently, the normally used Pd/Ag electrodes in MLCC are being replaced by Ni to make these capacitor more cost effective. However, there are some limitations in using Ni as an electrode material such as a large shrinkage mismatch with BaTiO₃ dielectric and an oxidation during binder burnout. To overcome these problems, an attempt to coat Ni particles with nano-thin BaTiO₃ layer has been made. At a first step, Ti-hydroxide layer was coated on Ni particle by dispersing on Ni powder in TiCl₄ butanol solution with diethylamine used as a gradual OH⁻ former and then Ti-hydroxide was converted into BaTiO₃ by using hydrothermal reaction with Ba(OH)₂ in water. The existence of nano-thin BaTiO₃ layer on Ni was confirmed using XRD, SEM, and TEM. The oxidation resistance and shrinkage retardation was also investigated using a dilatometer and XRD.