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MLCC제조공정에서 $BaTiO_3$ 성형 미세구조에 영향을 미치는 솔벤트의 특성에 관한 연구

Effect of Solvent on Green Microstructure Evolution of 100 nm $BaTiO_3$ Particles during Tape Casting for MLCC Application

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MLCC 제조공정에서 서로 다른 두 종류의 2성분계 솔벤트 시스템 (톨루엔/에탄올, 톨루엔/n-부탄올)이 $BaTiO_3$ 입자의 분산안정성과 Tape casting시 입자의 재배열에 미치는 영향을 연구하였다 톨루엔/에탄올 솔벤트 시스템은 톨루엔/n-부탄올 솔벤트시스템보다 분산성이 우수하지만 성형체의 밀도 및 미세구조는 톨루엔/n-부탄올 솔벤트 시스템이 우수한 특성을 보였다 슬러리의 분산안정성 및 성형 미세구조는 솔벤트의 물리화학적 특성과 밀접한 관계가 있으며 또한 성형건조공정시 온도 및 분위기는 성형체의 입자재배열에 큰 영향을 주었다

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Pore Evolution and Microstructure with Heating Profile in $BaTiO_3$ Based Ni-MLCCs with Y5V Specification

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The effects of heating profile in the burnout and sintering processes, especially heating rate and holding time, on the pore evolution and microstructure in Multilayer Ceramic Capacitors(MLCCs), were investigated to optimize the fabrication process MLCCs were sintered under different conditions, changing the heating rate as 1°C/min, 3°C/min and 5°C/min in both processes with and without the holding time at the sintering temperature of 1200°C The pore size distribution and cumulative pore surface area became broad and small, respectively, with an increase of the heating rate and sintering temperature The heating rate and the sintering temperature also affected the hysteresis between the mercury intrusion/extrusion behaviors Microstructure revealed that MLCCs were effectively densified in the slow heating rate, indicating that the full densification of MLCCs would be achieved in the heating rate of 1°C/min with the holding time of 3 h The heating rate in the burnout process predominantly affected the pore evolution and microstructure rather than that in the sintering process, showing the effect of the holding time in removing the residual pores and in developing final microstructure