

Low temperature sintering of MgTiO₃ with bismuth oxide based additions

Florent BELNOU, Jérôme BERNARD, David HOUIVET, Jean-Marie HAUSSONNE

LUSAC (EA2607), Université de Caen, BP 78, 50130 Cherbourg Octeville, FRANCE

MgTiO₃ is a classical material for type I MLCC. However its densification temperature is too high to allow co-sintering with copper electrodes. Investigations on low temperature sintering of MgTiO₃ show the complexity of this problem particularly when co-sintering with copper electrodes and thus a reducing atmosphere are involved in the process. Though feasibility of MgTiO₃ / copper MLCC has been demonstrated, studies have pointed out several remaining problems. Investigations on low temperature sintering of MgTiO₃ are thus still necessary to find a formulation which is not detrimental to dielectric behaviour. Sintering aid capabilities and/or good dielectric properties of bismuth oxide based additives make them good candidate materials to lower MgTiO₃ sintering temperature without altering its final properties. In this study bismuth titanate is either formed in-situ by reaction-sintering of Bi₂O₃-B₂O₃ additives with MgTiO₃ or obtained by pre-calcination of Bi₂O₃ and TiO₂ powders and then added to MgTiO₃ prior to sintering. Bismuth titanate appears as a good sintering aid that allows sintering of MgTiO₃ under 1000°C. It is yet highly sensitive to the nature of the sintering atmosphere, oxidizing or reducing. Dielectric properties of sintered specimens are compatible with type I capacitors applications.