Theme: High Permittivity MLCC Dielectric Material with Low Dielectric Constant Change

- Sub Theme: High Permittivity MLCC Dielectric Material with Low Dielectric Constant Change

Current electronics evolve to the direction of a mobile and multi-functional system resulting in a miniaturized circuit with extremely high density. Thus, multi-layer ceramic capacitor (MLCC) which is one of the most important passive components in electronic devices also requires miniaturization with high capacitance. Decrease of the thickness of dielectric layer is inevitable to enhance the volume efficiency. However, it causes many problems such as an increase of short failure and low reliability. BaTiO3 system has been widely used as a great dielectric material for MLCC. Now new dielectric materials should be considered to overcome the limit of BaTiO3 and for the innovation of MLCC industry.

We are aiming to find new dielectric materials superior to BaTiO3 that can be applied to MLCC. The required properties are high insulation resistance under high electric field, high dielectric constant, small variation of dielectric constants under dc-bias field, and stable temperature and frequency characteristics of dielectric constant.

· Dielectric constant (ε_r): More than 5,000
· Change in dielectric constant (ε_r) under dc field of 2.5V/μm: Less than 25%
· Change in dielectric constant (ε_r) under dc field of 5.0V/μm: Less than 50%

· Variation of dielectric constants (ε_r) in the temperature range of -55 ~ +125°C: Less than ±15%

· Insulation resistivity: Higher than 1E11 Ω-cm under dc field of 10V/μm

· Fundamental technologies and researches for the dielectric materials that are close to the above mentioned properties.

※ The topics are not limited to the above examples and the participants are encouraged to propose original idea.

※ Funding : Up to USD $150,000 per year