Contribution ID: **20** Type: **2. Invited speaker (by invitation only)**

Relationship among Grain Growth Behavior, Electrical Properties, and Crystal Structure in Dielectric Ceramics

Monday, 31 August 2026 14:10 (30 minutes)

Microstructure plays a key role in governing the functional properties of electronic ceramics. In this study, the relationship among grain growth behavior, crystal structure, and electrical properties is investigated based on the theory of two-dimensional nucleation–controlled grain growth. Perovskite systems, including barium titanate, barium calcium titanate, and sodium potassium niobate, are employed as model materials to examine the effects of various additives on grain growth and microstructural evolution. The results show that additive-induced modifications in interfacial and crystal structures significantly alter grain growth kinetics, resulting in distinct grain size distributions and growth behaviors. These variations are closely associated with phase stability, lattice distortion, and symmetry, depending on composition and additive chemistry. The underlying mechanisms are discussed in terms of interfacial energy and two-dimensional nucleation processes at grain boundaries. Dielectric properties, particularly relative permittivity and dielectric loss coefficient, are evaluated as functions of frequency and temperature. Strong correlations are observed between grain growth behavior, crystal structure, and dielectric response. The results demonstrate that controlled grain growth and structural tuning through additive engineering provide an effective approach to tailoring the frequency- and temperature-dependent dielectric performance of perovskite electronic ceramics.

Professional Status of the Speaker

Senior Scientist

Interest in submitting a paper in a special issue of

Journal of the European Ceramic Society (Elsevier)

Invitation letter for visa

Yes

Author: Prof. MOON, Kyoung-Seok (Gyeongsang National University)

Presenter: Prof. MOON, Kyoung-Seok (Gyeongsang National University)

Session Classification: Microstructure evolution during sintering and Microstructure-property relationships

Track Classification: Group 1: Microstructure evolution during sintering and Microstructure-property relationships