I will address the compositional stability range, microwave dielectric properties, and defect chemistry of the title compounds within the BaO-MgO-Ta₂O₅(Nb₂O₅) ternary diagram. I will further demonstrate that the dense, atomically ordered BaMg₁/₃M₂/₃O₃ and BaMg₁/₃Nb₂/₃O₃ ceramics show large variation of dielectric loss within a single phase composition region— a clear message that the dielectric loss in practical ceramics is dominated by extrinsic sources and that the cation order alone is insufficient to achieve a minimum dielectric loss in the title compounds. The low-temperature dielectric relaxation studies point out that the extrinsic dielectric loss in the title compounds is due to the ‘rattling’ of the off-centered Mg²⁺ ions misplaced at the Ba sites. Controlled deviation from the BaMg₁/₃M₂/₃O₃ stoichiometry toward the Mg-deficient region leads to suppression of the extrinsic dielectric loss as a result of the reduced chemical activity of Mg ion.

CBC SEMINAR ANNOUNCEMENT

Professor Taras Kolodiazhnyi
National Institute of Materials Science, Japan

Extrinsic dielectric loss in single phase, atomically ordered Ba(Mg₁/₃M₂/₃)O₃ where M = Nb, Ta