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Structure and Property Correlation in Bismuth Lithium Titanate: A Systematic Analysis

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Abstract: Bismuth lithium titanate (Bi□.□Li□.□TiO□) is synthesized by the conventional solid-state reaction method to examine its structural and electrical behaviour. X-ray diffraction analysis confirms the formation of a single-phase orthorhombic structure, while SEM shows non-uniformly distributed grains over the surface of the pellet sample. Impedance spectroscopy is carried out over broad frequency span (100 Hz–1 MHz) and wide temperature range 30–500 °C. The results indicate that the dielectric and conductivity properties are strongly frequency and temperature-dependent. Activation energy estimated from AC conductivity plots followed Arrhenius behaviour, suggesting mixed-type conduction. The overall study of the compound highlights the correlation between structure and electrical response in bismuth lithium titanate. The impact of frequency and temperature on complex immittance parameters are analyzed by an impedance analyzer in broad frequencies and temperature ranges.