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New Polar Oxide Materials: Design Strategies and Functional Properties[1] P. SHIV HALASYAMANI, HONG-YOUNG CHANG, SANG-HWAN KIM, Department of Chemistry, University of Houston, KANG MIN OK, Department of Chemistry Chung-Ang University — Polar oxide materials – those with a macroscopic dipole moment – are ubiquitous in advanced technologies, i.e. computer memories, sensors, etc. The design and synthesis of new polar oxides remains an ongoing challenge. Macroscopic polarity implies microscopic polarity, in other words some of the coordination polyhedra must be polar. Frequently, the local dipole moment in the coordination polyhedra is directed in opposite directions resulting in a non-polar material. In this presentation we will discuss strategies toward designing new polar oxide materials, as well as the characterization of their functional properties. Specifically we will demonstrate that by using cations susceptible to second-order Jahn-Teller (SOJT) effects we can substantially increase the incidence of macroscopic polarity in any new material. We will describe the synthesis of characterization of several new polar materials, as well as their functional properties and structure-property relationships.

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