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Effects of biaxial strain on the improper multiferroicity in h-LuFeO3 films[1] XIAOSHAN XU, KISHAN SINHA, Univ of Nebraska - Lincoln, YUBO ZHANG, Temple University, XUANYUAN JIANG, Univ of Nebraska - Lincoln, XIAO WANG, Bryn Mawr College, XIAOZHE ZHANG, Univ of Nebraska - Lincoln, PHILIP RYAN, JONG-WOO KIM, Argonne National Lab, JOHN BOWLAN, DMITRY YAROTSKI, Los Alamos National Lab, YUELIN LI, ANTHONY DICHIARA, Argonne National Lab, XUEMEI CHENG, Bryn Mawr College, XIFAN WU, Temple University — Elastic strain is potentially an important approach in tuning the properties of the improperly multiferroic hexagonal ferrites, the details of which have however been elusive due to the experimental difficulties. Employing the method of restrained thermal expansion, we have studied the effect of isothermal biaxial strain in the basal plane of h-LuFeO3 (001) films. The results indicate that a compressive biaxial strain significantly enhances the ferrodistortion, and the effect is larger at higher temperatures. The compressive biaxial strain and the enhanced ferrodistortion together, cause an increase in the electric polarization and a reduction in the canting of the weak ferromagnetic moments in h-LuFeO3, according to our first principle calculations. These findings are important for understanding the strain effect as well as the coupling between the lattice and the improper multiferroicity in h-LuFeO3.

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