

Abstract Submitted
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Ferroelectricity and Persistent Photocurrent in NaMnF₃ Thin Film¹ MING YANG, AMIT KC, PAVEL BORISOV, DAVID LEDERMAN, ALDO ROMERO, CHENG CEN, Department of Physics and Astronomy, West Virginia University, Morgantown, West Virginia 26506, USA — Abstract: While studies of complex oxides have yielded many fascinating phenomena based on electron correlation effects, there are strong indications that complex fluorides may have analogous, or even enhanced properties. NaMnF₃ is one such example, where multiferroic characters and magnetoelectric coupling have recently been predicted theoretically. Thin films of NaMnF₃ with 50 nm thickness were grown on SrTiO₃ substrates via molecular beam epitaxy. Ferroelectric properties of NaMnF₃ were studied by piezoelectric force microscopy. Stable ferroelectric switching were obtained at room temperature by biased scanning probe. In addition, the sample also exhibits an interesting coupling between its out-of-plane polarization and in-plane electric field applied. At low temperatures, photocurrent was observed under 400 nm laser illumination. Amplitude and direction of such photocurrent can be hysterically controlled by external biases. This phenomenon likely results from the combined effects of built-in field in ferroelectrically polarized NaMnF₃ thin film and the photocarriers generated in SrTiO₃ substrate. These findings indicate great potential of complex fluorides in applications such as ferroelectric capacitors, switches, and memory devices.

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