

# **Tetragonal Ferroelectric Phase of GdMnO<sub>3</sub> Epitaxial Thin Film Grown onto SrTiO<sub>3</sub> (001)**

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High quality GdMnO<sub>3</sub> thin films were deposited on SrTiO<sub>3</sub> (001)-oriented substrates by RF magnetron sputtering. The structure, microstructure and polar properties were investigated in detail. The films grown up to a 35 nm thickness exhibit an epitaxial non-relaxed tetragonal symmetry, where the basal lattice parameters are imposed by the cubic symmetry of the substrate, contrarily to the expected orthorhombic one. In Addition, the slower growth rate imposed by the RF-sputtering method, in comparison to other synthesis processes, can contribute to largely extend the thickness threshold for which the GdMnO<sub>3</sub> phase can yield epitaxially grown tetragonal films. Furthermore, a noteworthy variation of electric polarization was observed around 31 K that is apparently a consequence of the significant structural distortions occurring below that temperature. The stabilization of an improper ferroelectric phase occurring at low temperatures points to a substantial differentiation concerning the GdMnO<sub>3</sub> in orthorhombic form.

## **Summary**

## **Topic**

1. Multiferroics and ferroelectrics

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