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Annealing dependence of ferroelectric domain patterns in h-*REMnO*₃ JAE SUNG SHIN, Seoul Natl Univ, NARA LEE, YOUNG JAI CHOI, Yonsei University, SEUNG CHUL CHAE, Seoul Natl Univ — Topological vortices with complex ferroelectric domains and domain walls exist in hexagonal rare-earth manganites(h-*REMnO*₃). When h-*REMnO*₃ crystals are grown below the ferroelectric-trimerization transition temperature (T_c), they exhibit stripe domains. However, when a h-*REMnO*₃ crystal with stripe domains is heated above and cooled down across T_c , vortex domains emerge in the crystal. The networks of vortices are found to be in two different types : type-I domains with roughly equal fractions of upward and downward polarization domains and type-II domains with one dominant polarization. In this presentation, we report the post annealing effect on the ferroelectric topology under varying the ambient condition with N₂ gas. We observed two different types (type-I and type-II) of vortex domains using piezoresponse force microscopy and compared the topology change with Monte Carlo simulation with varying internal electric field. We observed domains of YMnO₃ start to increase upward polarization domain area fraction from 10% to 65% through the post annealing processes. We analyzed the correlation between internal electric field and off-stoichiometry condition.

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