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Electric-field poling effect on thermal stability of monoclinic phase in a (110)-oriented $\mathbf{Pb(Mg_{1/3}Nb_{2/3})_{0.74}Ti_{0.26}O_3}$ crystal[1] V. HUGO SCHMIDT, R. R. CHIEN, C.-L. TSAI, Physics Department, Montana State University, Bozeman, MT 59717, CHI-SHUN TU, F.-T. WANG, Physics Department, Fu Jen University, Taipei, Taiwan 242, ROC — Temperature-dependent phase transformations in unpoled and poled samples cut from a (110)-cut $Pb(Mg_{1/3}Nb_{2/3})_{0.74}Ti_{0.26}O_3$ (PMNT26%) single crystal have been investigated by polarizing microscopy and dielectric permittivity. X-ray diffraction (XRD) at room temperature (RT) was also measured. Poling was done at RT at various fields below and above the coercive field ($\sim$3 kV/cm). XRD and polarizing microscopy at RT indicate that the unpoled sample has a dominant rhombohedral (R) phase coexisting with some monoclinic (M) phase, i.e. $R(M)$, whereas the poled sample has coexistence of R and$M$ phases, i.e. R/M, in which the fraction of the induced M phase increases with poling strength. In both unpoled and poled samples, continuous polarization rotation with increasing temperature via a monoclinic phase was revealed by polarizing microscopy from $\sim$360 K to 375 K, the same range in which a dielectric anomaly occurs in the poled sample. The crystal phase becomes cubic (C) at $\sim$395 K. Thus, the phase transition sequence is $R(M) \rightarrow M \rightarrow C$ in the unpoled sample and $R/M \rightarrow M \rightarrow C$ in the poled sample.

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