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Thermal expansion measurements in multiferroic $HoMn_2O_5$[1] CLARINA DELA CRUZ, FEI YEN, BERND LORENZ, C.W. CHU[2], Dept. of Physics and TcSUH, University of Houston, Houston,TX 77204-5002, M.M. GOSPODINOV, Institute of Solid State Physics, Bulgarian Academy of Sciences, 1784 Sofia, Bulgaria — Thermal expansion measurements were done on $HoMn_2O_5$ along the a,b,and c axes at zero applied magnetic field. Distinctive anomalies in the linear expansivities along the principal axes were seen at T_N=44K,T_C=39K,$T_{N'}$=20K and $T_{C'}$=15K with a notable negative c-axis thermal expansivity below 100K.All three axes were observed to shrink at T_N and $T_{N'}$, while a and b expand as c shrinks when it passes through T_C and $T_{C'}$, upon cooling. These anomalies are intimately correlated with anomalies in the dielectric constant and the specific heat at the phase transition temperatures. Our observations suggest that the coupling of the magnetic orders with the dielectric properties are mediated by strong magnetoelastic effects and the lattice anomalies play a crucial role in understanding the ferroelectricity in the compound. The anomalies associated with the ferroelectric transitions at T_C and $T_{C'}$, show a thermal hysteresis revealing the first order nature of the transitions.

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