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ACCEPTED MANUSCRIPT

# Thermal strain induced large electrocaloric effect of relaxor thin film on LaNiO<sub>3</sub>/Pt composite electrode with the coexistence of nanoscale antiferroelectric and ferroelectric phases in a broad temperature range

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## Abstract:

Ferroelectric/antiferroelectric thin/thick films with large electrocaloric (EC) effect in a broad operational temperature range are very attractive in solid-state cooling devices. We demonstrated that a large positive electrocaloric (*EC*) effect (maximum  $\Delta T \sim 20.7$  K) in a broad temperature range ( $\sim 110$  K) was realized in Pb<sub>0.97</sub>La<sub>0.02</sub>(Zr<sub>0.65</sub>Sn<sub>0.3</sub>Ti<sub>0.05</sub>)O<sub>3</sub> (PLZST) relaxor antiferroelectric (AFE) thin film prepared using a sol-gel method. The large positive *EC* effect may be ascribed to the in-plane residual thermal tensile stress during

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