Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting information for

Role of rare earth in the magnetic, magnetocaloric and magnetoelectric properties in $RCrO_3$ (R= Dy,Nd,Tb,Er) crystals

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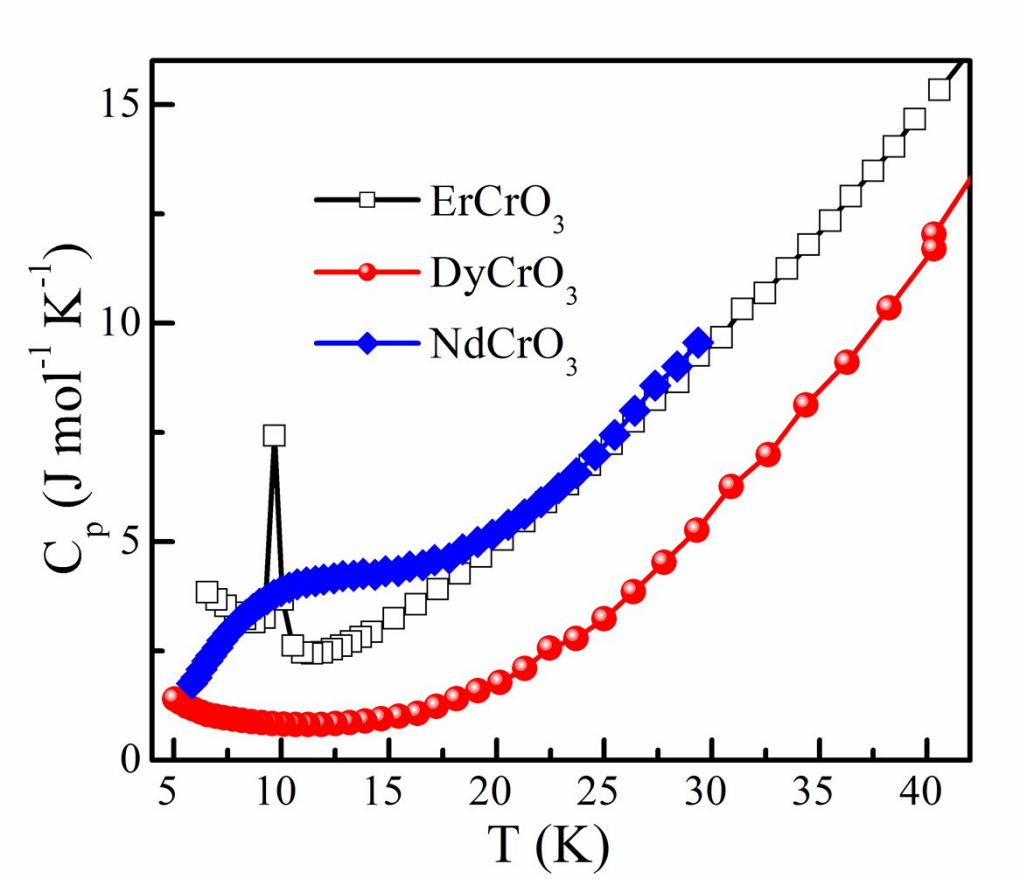

Figure S1 temperature dependent specific heat for RCrO$_3$ (R=Dy, Nd, Er) crystals.

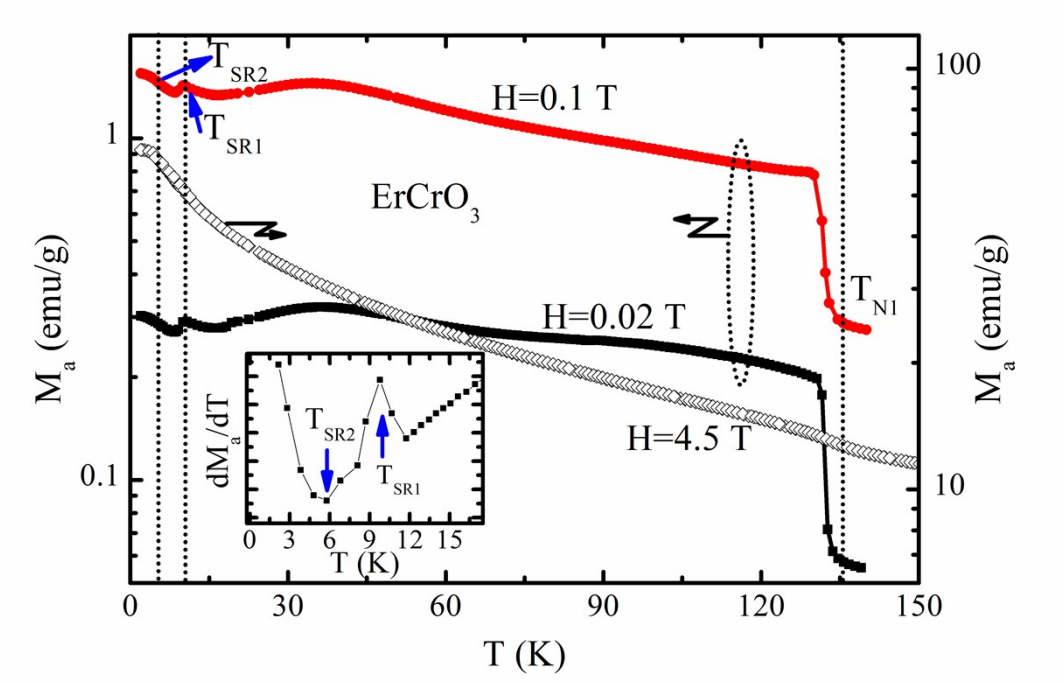

Figure S2 Temperature dependent magnetization under different H along a axis for ErCrO$_3$ crystals. Inset is the derivative M_a with respect to T at H=0.02T, which indicates the two magnetic transitions around T_{SR1} and T_{SR2}.

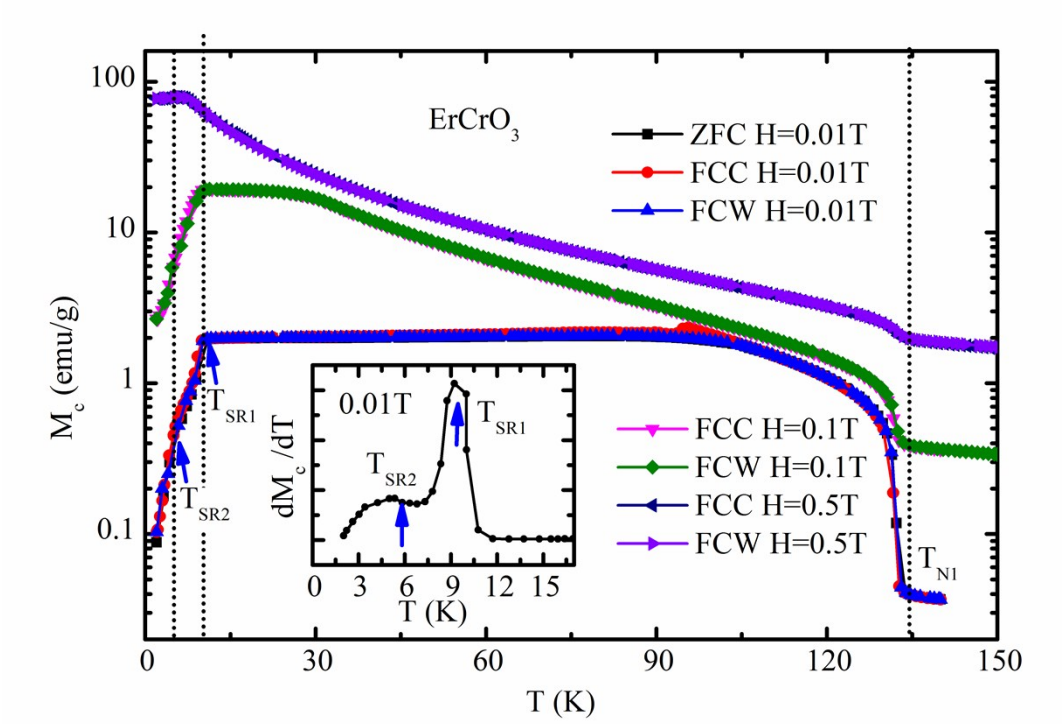

Figure S3 Temperature dependent magnetization under different H along c axis for $ErCrO_3$ crystals. The H-induced magnetic transition below T_{SR1} is obviously manifested by the gradual upturn of M_c under high H. Inset is the derivative M_c with respect to T at H=0.1T, which indicates the two magnetic transitions around T_{SR1} and T_{SR2}.

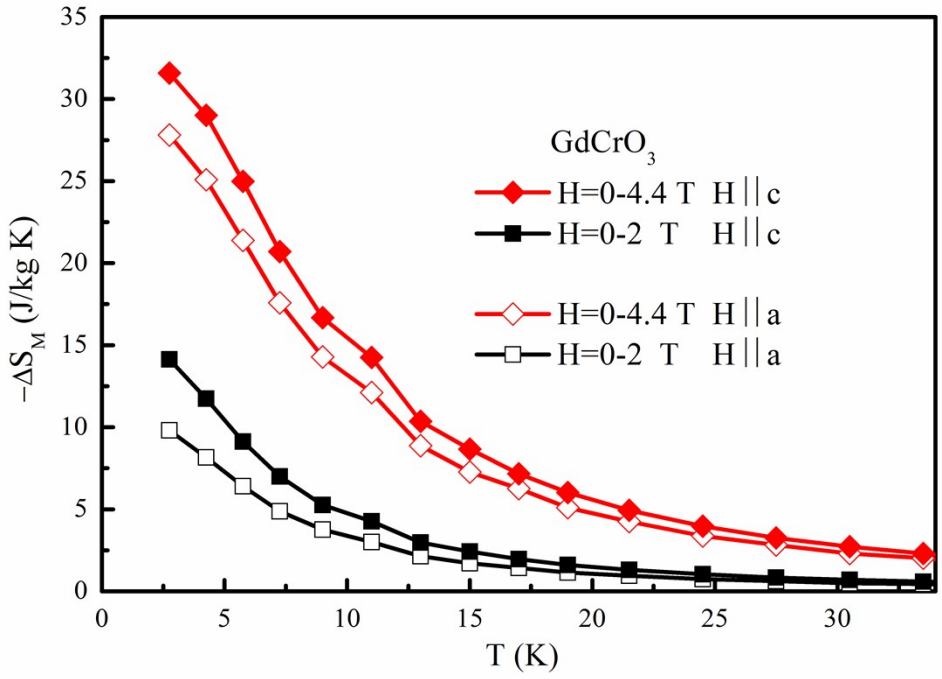

Figure S4 Magnetocaloric effect as a function of temperature along different axes for $GdCrO_3$ crystals.

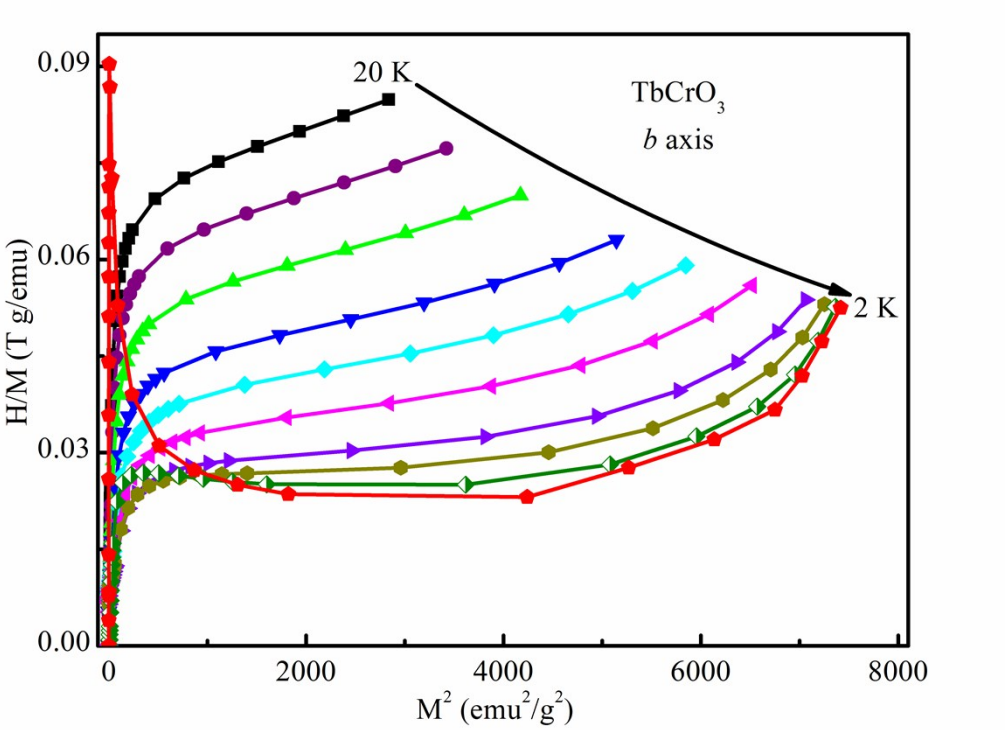

Figure S5 Arrott plots transformed from the isothermal magnetization (*M–H*) data along *b* axis for $TbCrO_3$ crystals. The slope of the Arrott plot becoming negative below ~T_{N2} is clearly shown.

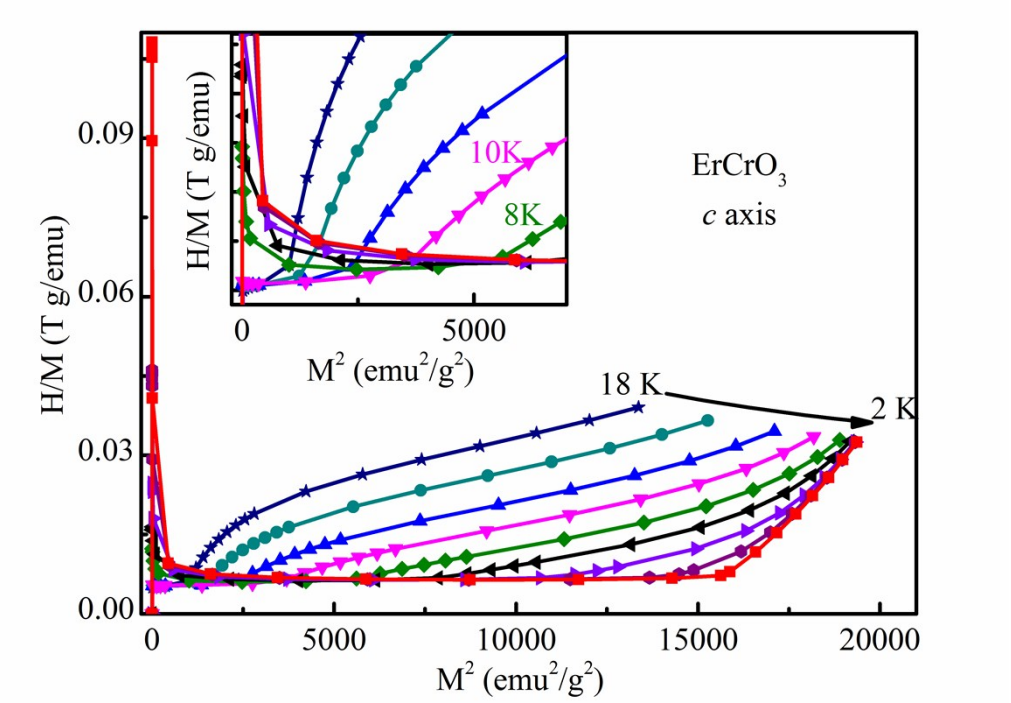

Figure S6 Arrott plots transformed from the isothermal magnetization (*M–H*) data along *c* axis for $ErCrO_3$ crystals. The slope of the Arrott plot becomes negative below T_{SR1}~10 K.

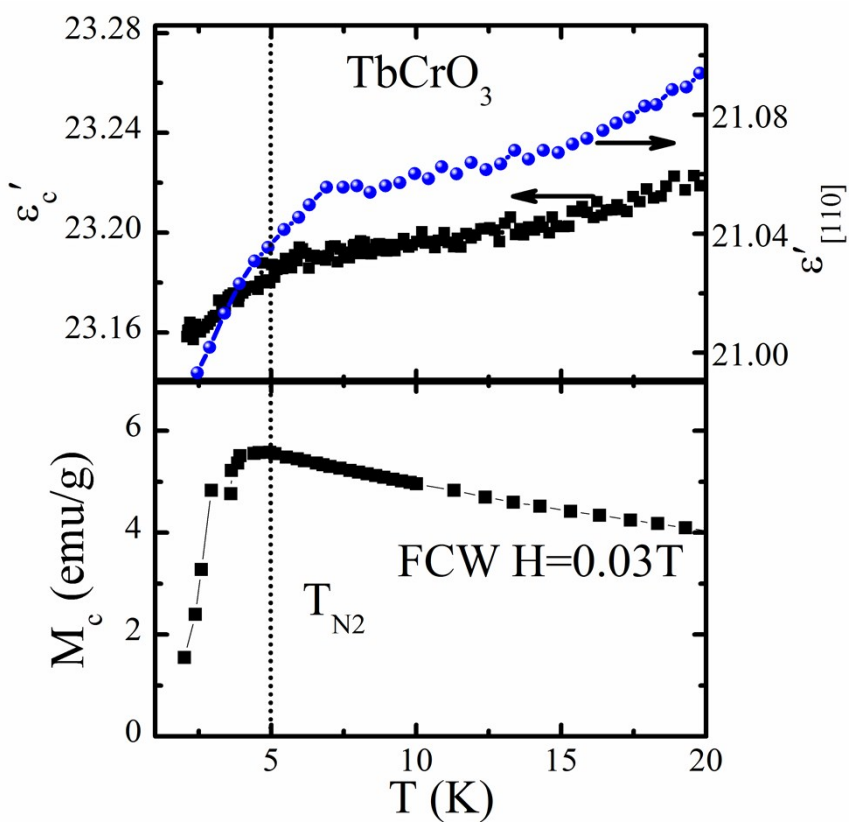

Figure S7 Dielectric constant as a function of temperature around T_{N2} along different axes for $TbCrO_3$ crystals (Top panel), and corresponding temperature dependence of magnetization around T_{N2} along *c* axis for $TbCrO_3$ crystals (Bottom panel).