Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supplementary materials 1:

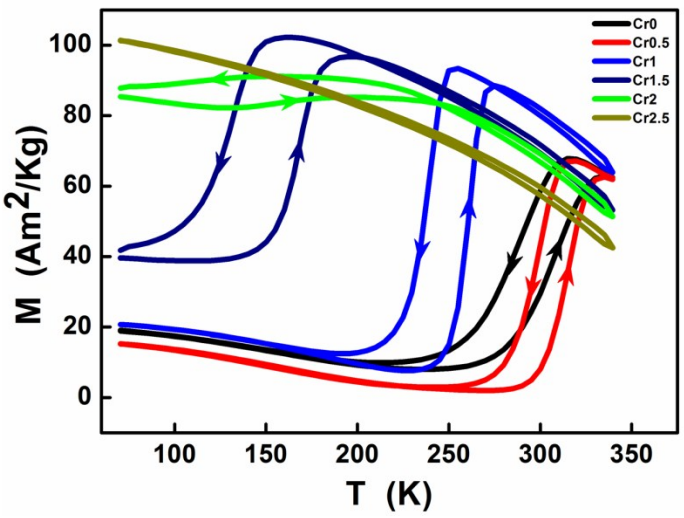

Fig. s1 Thermal magnetic curves of the $Ni_{43}Co_7Mn_{39-x}Cr_xSn_{11}$ alloys at H=1T.

Figure s1 shows the thermomagnetization curves of the $Ni_{43}Co_7Mn_{39-x}Cr_xSn_{11}$ alloys at applied magnetic field H=1T. With the content of Cr increased, the MT temperature of the sample moves to lower temperature. In the Heusler alloy, the MT temperature decreases with the decrease of the valence electron concentration e/a. The results in Fig. s1 is consistent with the law, as with the increase of Cr content, the e/a of the $Ni_{43}Co_7Mn_{39-x}Cr_xSn_{11}$ alloys decreases. When Cr 1% is doped, the martensitic transformation start temperature (Ms) of $Ni_{43}Co_7Mn_{38}Cr_1Sn_{11}$ alloy decreases to 250K under 1T magnetic field, which is about 60K lower than that of $Ni_{43}Co_7Mn_{39}Sn_{11}$. The magnetization difference (ΔM) between the parent phase and martensite reaches 80 Am^2/kg in the MT at 1T magnetic field. When the ratio of Cr is up to 2%, the MT of the alloy is restrained. Then increasing further the Cr content to 2.5% and 3%, the MT disappears in the temperature range of 60K-340K for the $Ni_{43}Co_7Mn_{39-x}Cr_xSn_{11}$ alloy.

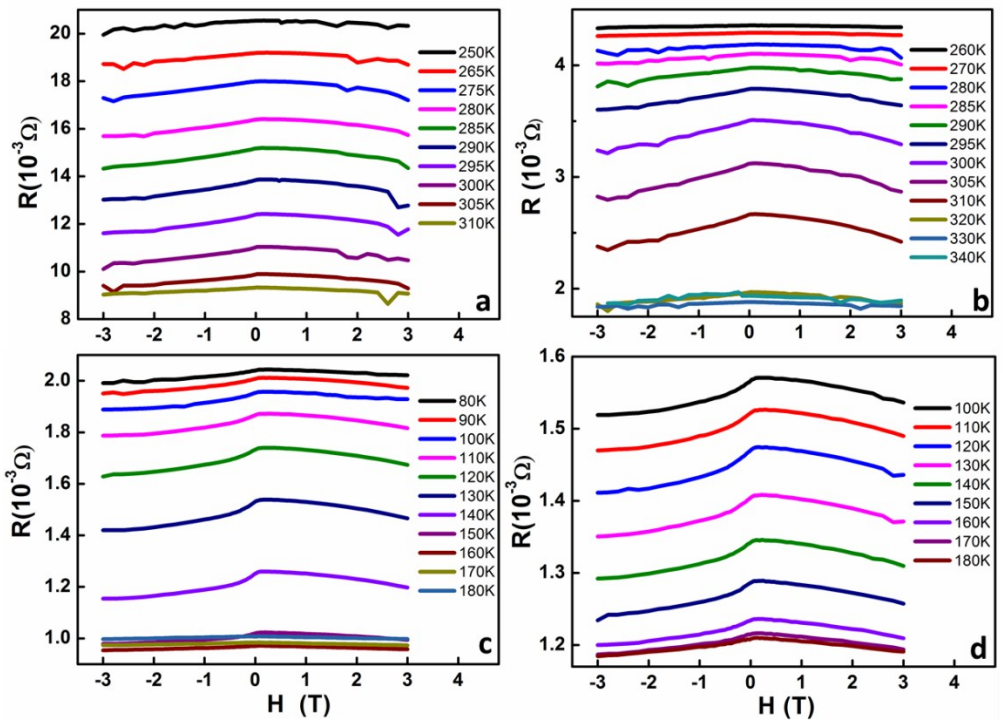

Fig. s2 Resistance in magnetic field of the $Ni_{43}Co_7Mn_{39-x}Cr_xSn_{11}$ alloys (a) x=0, (b) x=0.5, (c) x=1.5, (d) x=2 at different temperatures near the phase transition temperature.

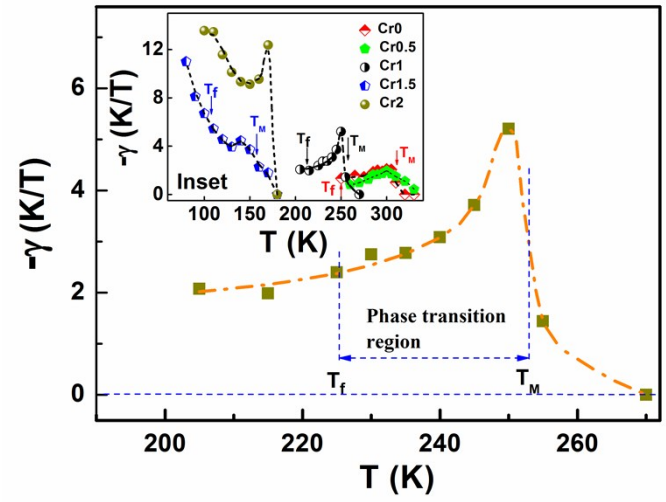

Fig. s3 Temperature dependence of γ of the $Ni_{43}Co_7Mn_{38}Cr_1Sn_{11}$ alloy. T_M: martensitic transformation on-set temperature, T_f : martensitic transformation finish temperature. The inset shows the Temperature dependence of γ of the $Ni_{43}Co_7Mn_{39-x}Cr_xSn_{11}$ alloys.