

Abstract Submitted
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Evolution of Anomalous Hall Behavior in Pt/Co/Pt Trilayers NI-UYI SUN, RONG SHAN, Tongji University — A series of Pt (t nm)/Co (0.5 nm)/Pt (5- t nm) trilayers with various thickness were prepared and post annealed for changing the proportions among the skew scattering (a), side jump and intrinsic contributions (b), which dominate the anomalous Hall effect in these films from a general point of view. The shape of Hall angle curve (ρ_{AH}/ρ_{xx} versus ρ_{xx}), as expected, turned from bending to linear and then bending again with raising the annealing temperature. The conventional scaling expression $\rho_{AH}/\rho_{xx} = a + b\rho_{xx}$ is not adequate for the analysis of anomalous Hall effect, especially in those very thin films since side jump is suppressed by surface roughness and the skew scattering is enhanced by the interfacial scattering. The evolution of anomalous Hall behavior with temperature demonstrates the reliability of identifying the skew scattering as a cooperation of a residual resistance of impurities and a phonon scattering. Likewise, the thermal treatment can also tune the side jump contribution, so as to the ratio between the side jump scattering and the skew scattering, leading to a change of the shape of Hall angle curve. The distinct physical image was exhibited by 3D maps of correlation coefficient for ρ_{AH}/ρ_{xx} and ρ_{xx} , which may help to build a proper synergy between theory and experiment on the research of anomalous Hall effect.

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