ABSTRACT

Some Physical Properties of Mn Based Alloy and Compound Films

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The study of thickness dependence of physical properties is vital in understanding the effect of the reduced third dimension of TF systems. Since electron scattering centres are formed mainly during the film growth, the deposition parameters such as film thickness, deposition rate, substrate temperature and post-deposition annealing affect various physical properties of thin films (TFs).

A comparative experimental study of MnBi with MnAl and MnTe with MnSe films was performed on (a) electrical resistivity, (b) TCR, (c) phase transition in the temperature range 40 K - 295 K, (d) Hall coefficients, (e) activation energy, (f) optical, (g) photoconducting and (h) mechanical properties. The effect of deposition parameters such as substrate temperature, atomic ratio and thermal treatment on the above properties were studied. The experimental results were analysed in the light of existing theories. A computer-based technique called the optimum selection method was used to evaluate TF

parameters. The limitations of these models and their suitability are briefly outlined.

The surface morphology and crystallographic properties of these films were studied using SEM and X-ray diffraction techniques, respectively. These results are compared with the existing experimental data on the same material or on closely related materials.