

# Magneto-transport and thermoelectric properties of MBE-grown MnP films on GaAs (100)

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MnP single crystal has been known as strong magnetic anisotropy material with helical magnetic order below 47K and ferromagnetic order between 47K and 291.5K [1, 2]. The MnP crystallographic structure is orthorhombic, with lattice constants of  $a=5.916\text{\AA}$ ,  $b=5.260\text{\AA}$ , and  $c=3.173\text{\AA}$ , which is distorted from the NiAs-type hexagonal crystal structure [3]. In this work, we report on anomalous Hall effect and thermoelectric properties of MnP thin films grown at 300 and 400 °C on GaAs (001) substrate by using MBE. Orthorhombic structure of MnP films were observed by X-ray diffraction measurement in both films. Scanning electron microscopy measurements showed that the surface morphology of MnP film grown at 400 °C was smoother than that grown at 300 °C. Anomalous Hall effect was observed in both films. However, the hysteresis trend in Hall resistance vs. magnetic field of MnP film grown at 400 °C is stronger than that of MnP film grown at 300 °C. The metallic behavior was observed in temperature dependent electrical resistivity. Thermoelectric power factor (PF) that was calculated from seebeck coefficient and resistivity by formula  $PF = S^2/P$  (where S: seebeck coefficient and P: resistivity). A negative magnetoresistance of MnP films indicated a ferro/ferri-magnetic ordering in both MnP thin films.

## References

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