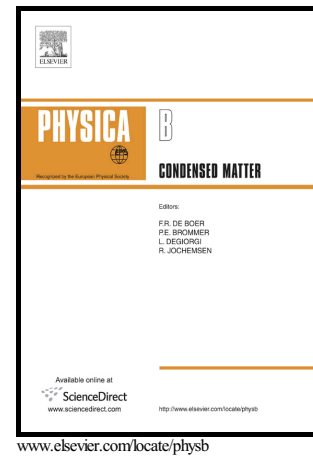


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Observation of anomalous Hall effect and large
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Oxidized Mn:Ge magnetic semiconductor: Observation of anomalous Hall effect and large magnetoresistance

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Abstract

We report on the structural and magneto-transport properties of the as-grown and oxidized Mn:Ge magnetic semiconductors. Based on X-ray diffraction and X-ray photoelectron spectroscopy results, the samples annealed at 650 and 700°C became fully oxidized and the chemical binding energies of Mn was found to be Mn_3O_4 . Thus, the system became Mn_3O_4 clusters embedded in $\text{Ge}_{1-y}\text{O}_y$. The as-grown sample showed positive linear Hall effect and negligible negative magnetoresistance (MR), which trend remained for the sample annealed up to 550 °C. Interestingly, for the samples annealed at above 650°C, we observed the anomalous Hall effect around 45 K and the giant positive MR, which are respectively 59.2% and 78.5% at 7 kOe annealed at 650°C and 700°C.

Keywords — diluted magnetic semiconductor; ferromagnetic cluster; thermal annealing; oxygen; magnetoresistance.

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