

Ferromagnetism of MnZnO system doped with Zn₃P₂

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The magnetic properties of Mn-doped ZnO are strongly influenced by the doping amount and sintering temperature. These characteristics of Mn-doped ZnO samples are still not totally understood. In this work, MnZnO doped with Zn₃P₂ were prepared by conventional ceramic method to study the magnetic properties dependent on the sintering temperature. The sample preparation were used Sharma *et al* [1] who reported ferromagnetism at RT in the Mn:ZnO system. Two different sets of samples, MnZnO doped with 2 wt% and 5wt % of MnO₂, showed ferromagnetism at room temperature.

High purity ZnO (99.99 %) and MnO₂(99.99%) raw powders were mixed and fired at 400 C for 8 hr in air. After that the powder samples were milled and pressed. Finally the samples were sintered at 500 for 12 hr in air. X-ray diffraction pattern indicated a single phase polycrystalline ZnO structure without any MnO₂ phases. The concentration of Mn was determined by energy dispersive X-ray. The magnetic behaviors of MnZnO doped with Zn₃P₂ carried out using alternating gradient magnetometer at room temperature. In the all of MnZnO samples, ferromagnetism was observed at room temperature, although paramagnetism contributed mainly to the total magnetic moment. Saturation magnetization of MnZnO with 5 % of MnO₂ including Zn₃P₂ showed 3 times higher value than that of MnZnO without Zn₃P₂.

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- [1] P. Sharma, A. Gupta, K. V. Rao, F. J. Owens, R. Sharma, R. Ahuja, O. Guillen, B. Johansson and A. Gehring 2003 Nat. Mater. 21 673