

Photoconductivity of magnetic semiconductor thin films in magnetic state with reentrant transition

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Thin films of magnetic semiconductors $\text{CdCr}_2\text{Se}_4:\text{In}$ have been investigated as the prospective element of near-infrared detectors. It is soft magnetic material in magnetic state with reentrant transition (REE). The energetic structure is modified by magnetic interaction and finally the photoconductivity properties are effected. Thin films are obtained by rf sputtering technique, the magnetic properties were investigated by ferromagnetic resonance (FMR) and field-cooled and zero field-cooled dc magnetization measurements fig 1. The local atomic environments around Cr and Se ions were found from the EXFAS measurements. The basic parameter of a photoconductor; the spectral response was determined within the temperature range from 77K to 300K for wavelength from 400nm to 1000nm. Fig.2 presents the spectral response R_v for $\text{CdCr}_{1.97}\text{In}_{0.03}\text{Se}_4$. It was found, on the base of experimental data, that the magnetic semiconductors with REE transition are the promising material for application as photodetectors with detectivity about $10^7 \text{ mHz}^{1/2}\text{W}^{-1}$.

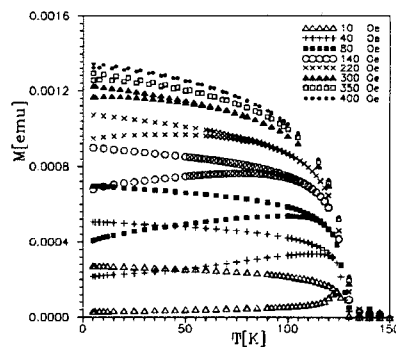


Fig.1. DC magnetisation: field-cooled and zero field-cooled

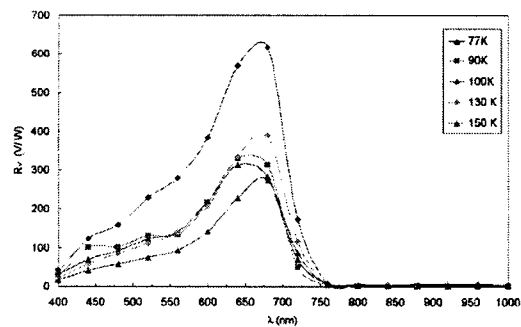


Fig.2 Spectral response R_v for $\text{CdCr}_{1.97}\text{In}_{0.03}\text{Se}_4$