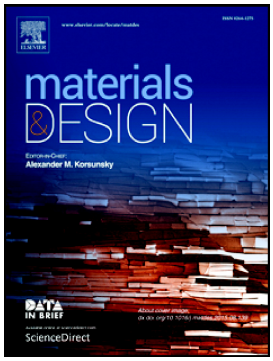

Transparent magnetic semiconductor with embedded metallic glass nano-granules

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Abstract

One central material issue in spintronics is the search for high temperature (above room temperature) magnetic semiconductors. We report on formation of a transparent magnetic semiconductor with embedded ferromagnetic metallic glass nano-granules, showing a Curie temperature of ~600 K. Soft X-ray magnetic circular dichroism data verify its intrinsic room-temperature ferromagnetism. Owing to the unique structure of ferromagnetic nano-granules embedded in the host magnetic semiconductor, additional interfacial exchange anisotropy emerges and stabilizes the ferromagnetism. The magnetotransport measurements of the amorphous nanocomposite indicate that its anomalous Hall effect is dominated by the extrinsic mechanism of the side-jump due to the spin-dependent impurity.

Keywords: Metallic glasses; Magnetic semiconductor; Nano-granules.