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Enhanced tunneling magnetroresistance and high spin polarization in polystyrene coated Fe_3O_4granular system[1]

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Polystyrene coated Fe_3O_4 nanoparticles through surface engineering exhibit intergranular tunneling magnetoresistance (MR) ratio of 22.8% at room temperature and a maximum MR of 40.9% at 110 K. The drastic enhancement of the MR ratio clearly suggests that there is high degree of spin polarization even at room temperature for half metallic Fe_3O_4. The derived spin polarization P is about 54% and 83% at room temperature and 110 K, respectively. It is possible that a simple tunnel junction made of Fe_3O_4exhibits large MR in a relatively small field. Fe_3O_4 may also be used as an effective spin injector. Knowing that our results provided only a lower limit on the spin polarization of Fe_3O_4, it has the potential to play an important role in spintronic devices.

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