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Giant magnetic anisotropy of 5d dopants in graphene and boron nitride monolayer[1] JUN HU, RUQIAN WU, Department of Physics and Astronomy, University of California, Irvine, CA 92697 — Searching for novel magnetic nanostructures is urgent due to the need for the miniaturization of spintronics devices. One of the main bottlenecks for this is the low blocking temperature (<10 K) in most magnetic nanoentities studied so far. In this work, we predict that extremely high blocking temperature can be achieved in graphene or boron nitride monolayer by embedding 5d transition metal (TM) atoms, based on density functional theory calculations. For example, the size of the magnetocrystalline anisotropy energy (MAE) of Re/graphene or Re/BN can be larger than 20 meV for each Re atom, sufficient for room temperature magnetic recording and spintronics applications. We provide physical insights for the further development of nanostructures with larger MAE.

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