

Study of effect of functionalization of black phosphorene on its spin-transport and magnetic properties

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Abstract

First-principles spin-polarized density functional theory investigations are reported to understand the effect of functionalization (vanadium and titanium) on tunnelling magnetoresistance (TMR) and spin-polarized transport of black phosphorene () nanosheet based magnetic tunnel junction (MTJ) with CrO₂ as electrodes. The results show, vanadium adsorbed black phosphorene based structure exhibits better spin filtration and high TMR, as compared to titanium adsorbed black phosphorene and pristine black phosphorene based structures. In addition, vanadium adsorbed black phosphorene nanosheet exhibits ferromagnetic behaviour with a magnetic moment of . The magnetic moment for pristine black phosphorene and titanium adsorbed black phosphorene nanosheets are reported to be and , respectively. Higher TMR, better spin filtration and ferromagnetic behaviour for vanadium adsorbed black phosphorene based structure opens up its possibility as spin filter (injector) in MTJs and other spin-based devices.

2. “Design and implementation of FIR filter with modified product accumulation block using booth multiplier”; 2017

[31st World Nano Conference](#); Webinar- November 24, 2020.

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Biography:

Shweta Meena has completed her PhD at the age of 30 years from National Institute of Technology, Kurukshetra, India. She is working as Assistant Professor in Department of Electronics & Communication Engg, National Institute of Technology, Kurukshetra, India. She has published papers in reputed journals and in international conferences.

Speaker Publications:

1. “Enhancing TMR and spin-filtration by using out-of-plane graphene insulating barrier in MTJs”; Phys. Chem. Chem. Phys. 2017,19, 17765-17772