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Spin transport through molecules of graphene fragments¹ PARTHA MITRA, SEMANTI PAL, ARPITA MANDAL, ARINDAM MUKHER-KEE, Indian Institute of Science Education and Research Kolkata — A variety of molecular structures that are essentially fragments of a graphene layer can be synthesized chemically. One such structure is 9-hydroxyphenalenone(PLY) that consist of three fused benzene rings and has one unpaired electron delocalised over the entire planner ring. Various molecules with PLY ligands and metal centers are previously reported showing interesting properties including spin filtering effect. We showcase a new molecule, denoted as Mn-PLY, where three PLY ligands are coordinated with one Mn(III) ion. Bulk susceptibility measurement exhibits paramagnetic behaviour down to 40K and onset of ferromagnetism thereafter. Crystal packing arrangement shows that PLY from two neighboring molecules stack on top of one another with separation $\sim 3.7 \text{Å}$. Thus, Mn-PLY is a promising material where injected spins can be envisaged to travel between molecules. Mn-PLY thin films were prepared by controlled thermal evaporation using effusion cells and fabricated device structures using lithography techniques. Distinct spin valve effect signals were observed from trilayer structures of Cobalt/Mn-PLY(5-20nm) /Permalloy with MR ratio $\sim 2\%$ at room temperature. Detailed studies of spin valve effect and non-local measurements to probe Hanle effect will be presented.

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