

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Pure spin current transport in Alq₃ by spin pumping SHENGWEI JIANG, PENG WANG, ZHONGZHI LUAN, XINDE TAO, HAIFENG DING, DI WU, Nanjing University — The use of organic semiconductors (OSCs) in spintronics has aroused considerable interests, owing to their much longer spin-relaxation times of OSCs than those of inorganic counterparts. The most studied example is the organic spin valve (OSV), in which magnetoresistance (MR) effect is frequently reported. However, studies on pure spin current injection and transport in OSCs are scarce. Recently, the pioneering work by Watanabe et al. demonstrated that pure spin current can be pumped into and propagates in semiconducting polymers [1]. In the present work we extend the study to small molecule OSCs, and demonstrate that pure spin current can be injected into Alq₃ from the adjacent magnetic insulator Y₃Fe₅O₁₂ (YIG) by spin pumping. The pure spin current is detected by inverse spin Hall effect (ISHE) in Pd after propagation through Alq₃. From the ISHE voltage V_{ISHE} as a function of the Alq₃ thickness, the spin diffusion length is determined to be ~ 50 nm and does not depend on temperature. This result indicates the MR decrease as increasing temperature in OSVs is not due to the reduced spin diffusion length.

[1] S. Watanabe, et.al, Nat. Phys. **10**, 308 (2014).

Shengwei Jiang
Nanjing University

Date submitted: 05 Dec 2014

Electronic form version 1.4