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Inelastic tunneling spectroscopy study on organic semiconductor tunnel barriers with magnetic electrodes[1] K.V. RAMAN, J.H. SHIM, J.S. MOODERA, MIT — Spin injection and transport through organic semiconductor (OS) is recently being researched extensively. Exploring the interfacial structural and chemical modifications in FM/OS/FM tunnel junctions can lead to a better understanding of spin injection and transport in OS. Inelastic tunneling spectroscopy (IETS), a high sensitivity technique, measures the vibrational and excitational modes of the molecules within a tunnel barrier, which are greatly influenced by any distortions in the molecules. These measurements are performed on thin films of OS, rubrene and pentacene, using Co/seed/OS/Py and Al/seed/OS/Al junctions, all grown in-situ, for two different seed layers viz. Al_2O_3 and LiF. The IETS spectra matches well with the reported Raman and IR spectroscopy measurements performed for powder and bulk single crystal samples. In addition, the IETS spectra show weak signatures of the molecular distortions through modifications to certain phonon peaks. Due to the amorphous nature of the films certain electronic states are also observed at higher bias voltages. The effect of vibrational modes on the spin conserved tunneling and the effect of different electrodes on the IETS spectra will also be presented and discussed.

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