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Optical and Electronic Properties of Electrochemically Active Perylene Tetracarboxylic Diimide Molecules NAZANIN DAVANI, Department of Chemical Engineering, Stanford University, KEN SHIMIZU, Department of Material Science and Engineering, Stanford University, MICHAEL PREINER, Department of Applied physics, Stanford University, NICHOLAS MELOSH, Department of Material Science and Engineering, Stanford University, MELOSH GROUP TEAM — Perylene tetracarboxylic diimide (PTCDI) molecules form a unique class of n-type semiconductors with high thermal and photo stability. Understanding the electronic properties of these molecules in nanoscale systems may lead to novel applications in various molecular electronics devices. Using optical spectroscopy, we analyzed the optical and electronic properties of electrochemically active TE-PTCDI molecules self -assembled on gold electrodes. Surface Plasmon Resonance Spectroscopy is used to detect the refractive index of the monolayer. Cyclic voltammetry and SPR measurements are performed simultaneously to probe changes in reflectivity as the molecule undergoes redox reactions. In addition, the TE-PTCDI molecule is used in fabricating metal-insulating monolayer-metal devices using Polymer Assisted Lift Off (PALO) technique. The influence of the top metal contact on molecular properties will be discussed.

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