CHEMISTRY DEPARTMENT SEMINAR

Soft Organic Electrochemical Transistors and Polymers by Electrochemical Fabrication

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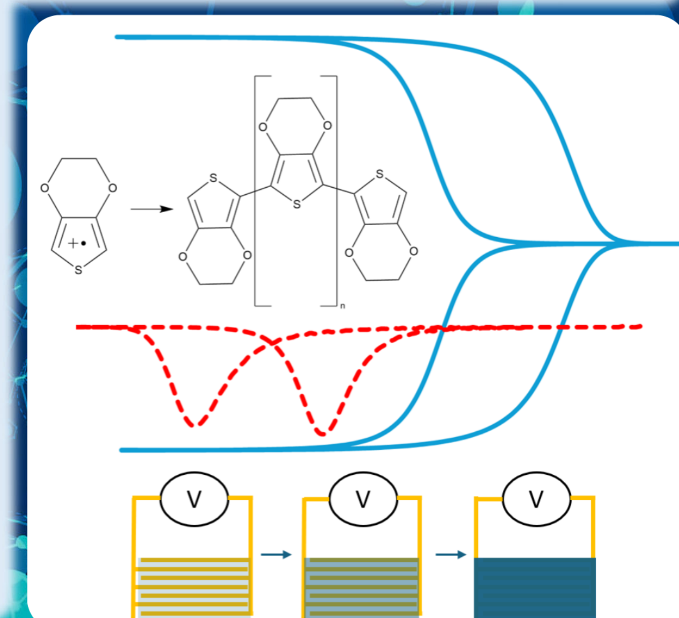
Electrochemical polymerization enables direct fabrication of electroactive semiconducting films from solutions. These materials are promising candidates for transistors that imitate neurons(neuromorphic) due to their ion exchange properties, stable conduction states, plasticity, low bias requirements, and high stability in aqueous solvents.

Here, we develop in situ and in operando methodologies to interrogate polymer growth from solution-phase oligomerization through film deposition and device formation. UV–Vis–NIR spectroscopy, electrochemical impedance spectroscopy (EIS), and voltammetry are combined to correlate transient spectroscopic and electrical signatures with material deposition and device performance

Using interdigitated electrodes, we demonstrate one-pot fabrication with in-situ EIS and bipotentiostatic evaluation to monitor capacitance and transconductance during layer-by-layer growth. Device performance is shown to evolve dynamically with fabrication conditions and film quality.



Finally, early-stage oligomerization is examined spectroscopically, including sterically hindered thiophenes that promote defect formation. Together, these in-situ and in-operando approaches provide insight to guide rational polymer and OECT fabrication.

March 13th @2 pm – Lopez 106