

Prof. Yen-Ju Cheng / Department of Applied Chemistry

Organic synthesis, polymer synthesis, Functional conjugated materials, organoelectronics

Our group specializes in design, synthesis and exploitation of organic and polymeric functional materials in various applications ranging from opto-electronics, photonics, biosensor and nanotechnology. By molecular engineering, we can manipulate physical, electronic and steric properties and smartly control the function of materials. Currently, we are engaged in the following research area: (1) Development of novel donor-acceptor conjugated polymer containing multi-fused ladder-type structures with forced coplanarity to achieve high intrinsic hole mobilities for organic photovoltaics and field-effect transistors. (2) Development of fullerene materials with tunable HOMO-LUMO energy levels to achieve high open-circuit voltage. (3) Interface engineering with thermally or photochemically crosslinked and self-assembled materials to achieve high efficiency of optoelectronic devices. (4) Utilization of supramolecular self-assembly between photoactive materials with ordered arrangement to achieve optimal and stable morphology. (5) Exploration of facile synthesis and new methodology for conjugated molecules and polymers, and construction of functionalized macromolecules with well-controlled architectures. (6) Elucidation of structure-properties relationship by microscopy, X-ray analysis, theoretical calculation and time-resolved spectroscopy.

