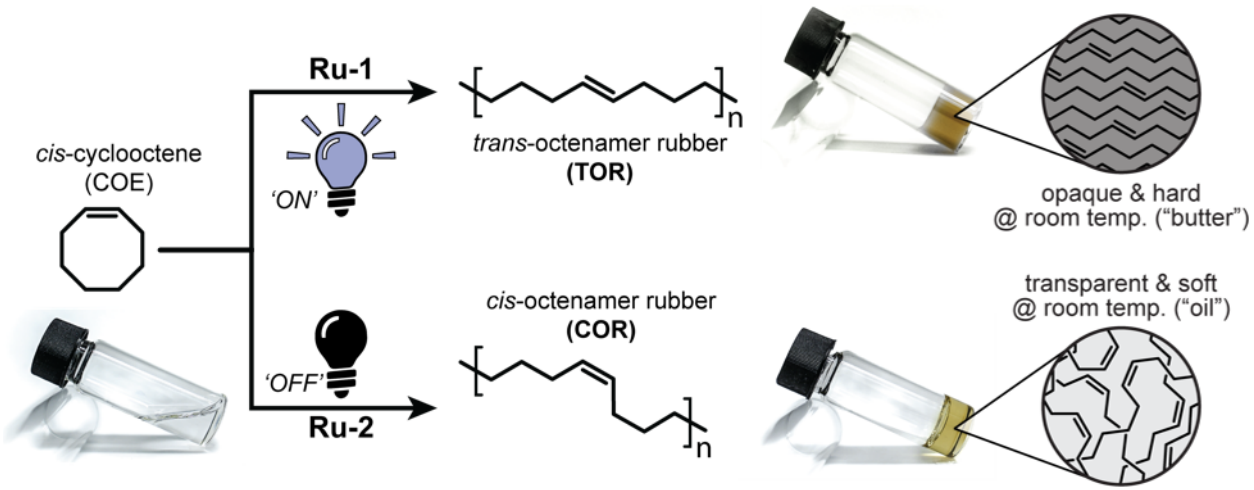
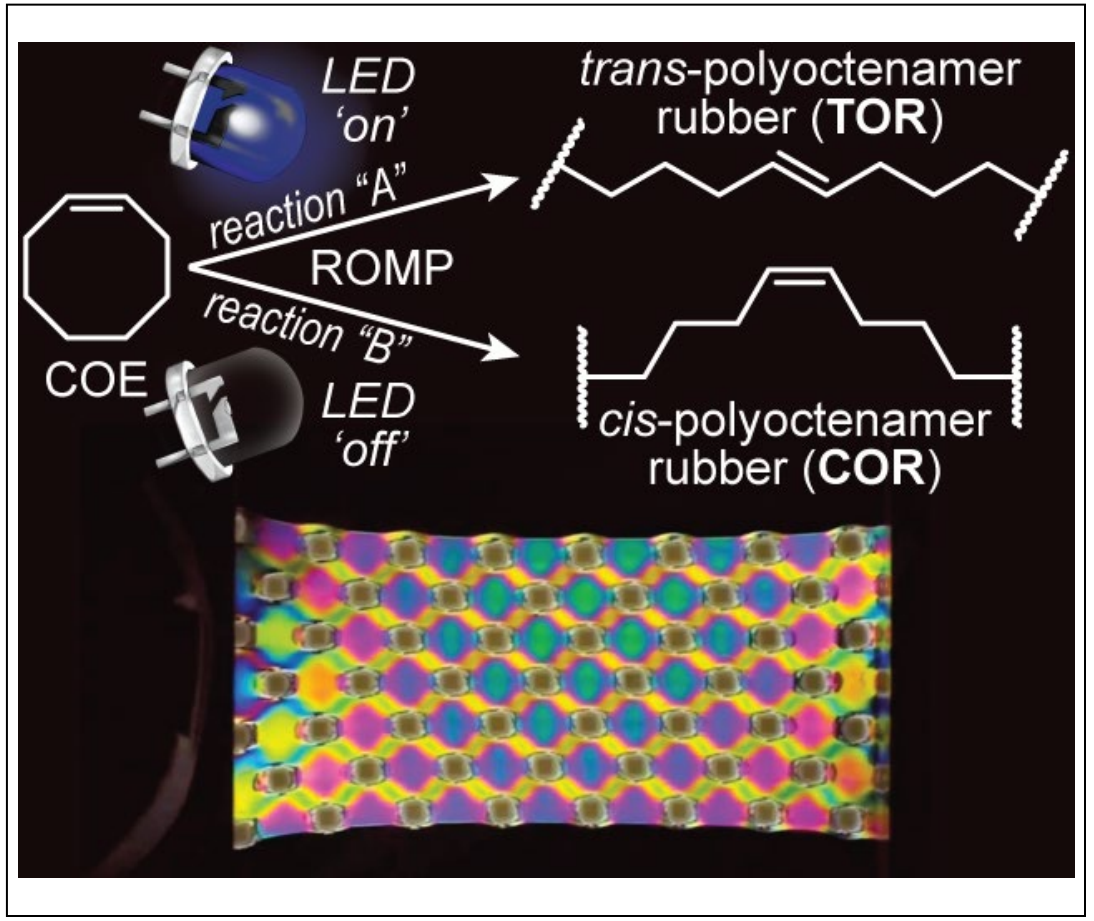
DMR-2045336

CAREER: Building Hierarchical Polymers with Light to Unify Softness, Resilience, and Conductivity

Zachariah A. Page, The University of Texas at Austin

- Visible light was used as a tool to create singular materials with stiff and soft patterned regions.
- A single building block could be utilized to generate either crystalline or amorphous polymers with high resolution, depending on where the light is shined.
- This simple approach to generate multimaterials takes inspiration from nature, where interfacing ‘soft’ and ‘hard’ regions is efficiently achieved on macroscopic and microscopic scales.
- This technology provides a novel method towards the invention of flexible electronics and soft robotics that can enhance quality of life (e.g., prosthetics or wearable health-monitoring devices).





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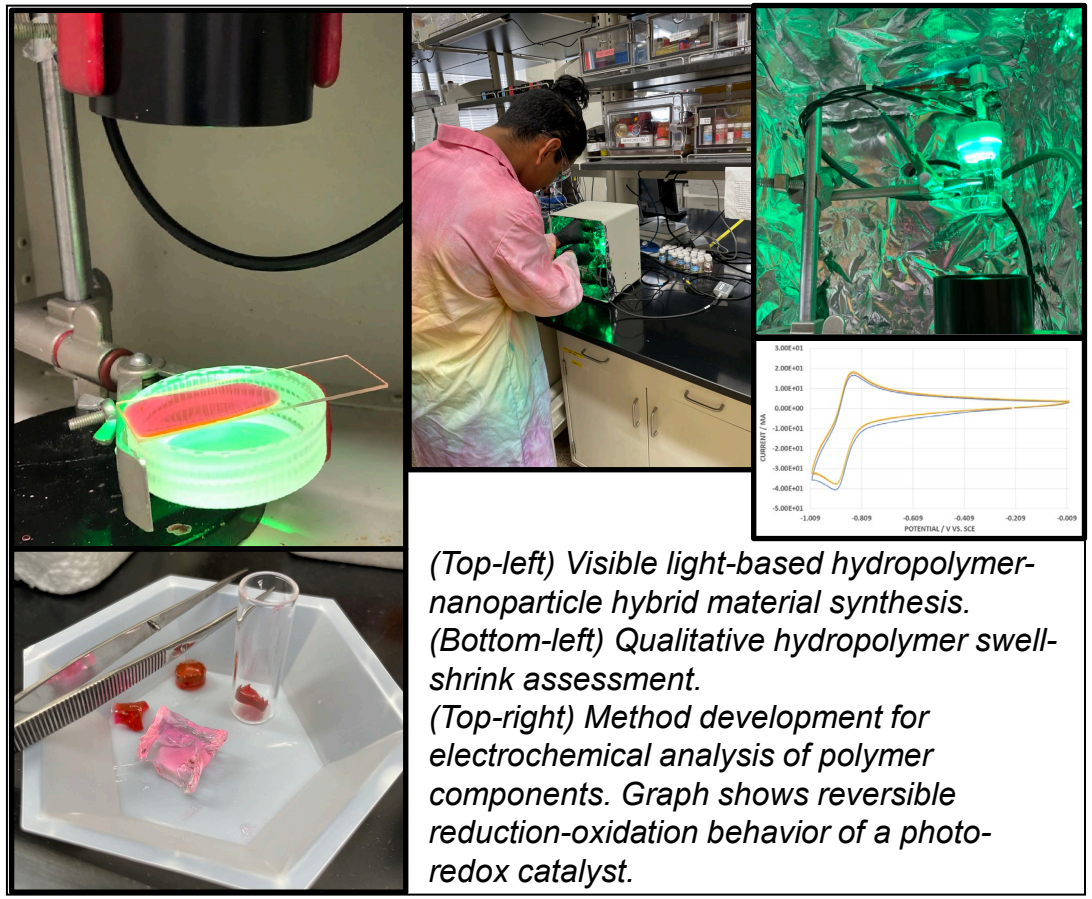
Materials in Color: A Freshman Research Initiative

Zachariah A. Page, The University of Texas at Austin

- FRI ‘Materials in Color’ (MiC) undergraduate researcher presents results at UT Research Symposium “Science Slam” requiring explanation of research in three minutes using layman terminology and a single slide visual aid. (FALL 2022)
- Six MiC undergraduate researchers present three research posters at the UT Undergraduate Research Forum. (SPRING 2023)
- MiC undergraduate researcher awarded UT Advanced Summer Fellowship for synthesis, characterization, and catalytic activity studies of hybrid polymer-nanoparticle materials. (SPRING 2023)
- Six new candidate photocatalysts for synthesizing hydropolymers are characterized via spectroscopy, qualitative polymerization reaction activity, and electrochemistry. (SUMMER 2023)
- Development and refinement of methods for semi-quantitative photopolymerization activity and electrochemistry-based singlet oxygen quantum yield. (SUMMER 2023)
- MiC hosts five high school and six middle school students through UT’s High School Research Academy and Shadow-A-Scientist outreach programs, respectively. (SUMMER 2023)



(Top-left) Visible light-based hydropolymer-nanoparticle hybrid material synthesis. (Bottom-left) Qualitative hydropolymer swell-shrink assessment. (Top-right) Method development for electrochemical analysis of polymer components. Graph shows reversible reduction-oxidation behavior of a photo-redox catalyst.