MICHAEL G. INMAN, and CHRISTOPHER A. DEROSA, Dept of Chemistry, West Virginia Wesleyan College, Buckhannon, WV 26201. A Piperidine-Substituted Chalcone as a Molecular Rotor for Luminescent Viscosity Sensing.

Modern applications make use of the luminescent materials and dyes for optoelectronics, textiles and fluorescence microscopy. Recently, organic-based fluorophores have garnered interest in fluorescent microscopy as brighter and non-toxic alternatives to metal complexes used in cell biology. While some organic fluorophores have emerged as commonly-used imaging agents, such as fluorescein and rhodamine, these lack the ability sense the microenvironment properties with spatial and temporal resolution. As a solution, we proposed a simple chalcone-based molecular rotor to sense cellular viscosity. A bulky piperidine ring is incorporated to undergo twisted intramolecular charge transfer (TICT) producing a dark, non-emissive state in fluid solution (e.g. water), but a rigid, emissive structure in a viscous environment (e.g. cellular membranes). Dyes were prepared via aldol condensation of the appropriate aldehyde and ketone pairs in low to moderate yields. Synthesis was confirmed by TLC, ^{1}H NMR, and IR. The optical properties of the piperidine-substituted dye and a less bulky dimethylamino derivative were compared for molecular rotor properties and TICT. Preliminary results in dichloromethane reveal green fluorescence and modest quantum yields (~22%). Viscochromic properties in solution, future directions and possible applications will be presented.