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Title: Synthesis and Studies of Azoarene and Azoheteroarene Connected Benzene Carboxamides as Potential Photoresponsive Liquid Crystals

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Abstract: Azobenzenes show reversible photoisomerization between E- and Z-isomers. Such molecules exhibit reversible photochromic properties and show potential applications in the field of data storage, optical sensors, actuators, rewritable imaging applications etc. Such photoswitchable units have been incorporated in various classes of molecules and materials to impart light control in such applications. Liquid crystalline (LC) materials equipped with photoresponsive groups have received a lot of attention in recent years. The ability of photochromic liquid crystals (LC) to change their mesomorphic state upon irradiation renders them several potential applications. Through functionalization of liquid crystals with azobenzene systems as photochromic groups, the LC phases can be changed to the isotropic phase upon irradiation. This has been attributed to the destabilization of LC phases arising due to the geometrical constraints in Z-isomer of the azobenzene. In this regard, we designed and synthesized six molecules, having amide linkages, that can enhance liquid crystalline propensity through hydrogen bonding networks and arenes that can lead to π - π stacking. Their photoswitching behavior and photostationary states (PSS) were investigated through UV-Vis and ^1H NMR spectroscopic techniques. Their preliminary results on liquid crystalline properties, investigated using Polarized Optical Microscopy (POM) are described. Through this work, the design and synthesis of the target molecules, their spectral characterization, photoswitching studies and LC studies are reported.

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