# Synthesis of new azobenzene derivatives and study of their liquid crystalline properties

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In the last years, azobenzene derivatives have been the focus of several studies because of their interesting optical properties, like the reversible *cis-trans* photoisomerization of the "azo" group[1]. In addition, the rigid rod-like azobenzene moiety is suited to spontaneous organization into nematic or smectic thermotropic liquid crystalline phases[2]. We think that both, the photoinduced and the liquid crystal properties may be strongly influenced by an increase in the anisotropic molecular shape of the azobenzene derivative. Following this, in the present work we have synthesized and studied the mesomorphic behavior of a series of azobenzenes substituted with an additional phenyl ring and lateral alkoxy chains of different length. The synthesis of compounds involved different reactions such as the formation of diazonium salts and its attachment with phenol, the insertion of alkoxy groups through a Williamson reaction, and the Palladium-catalyzed cross-coupling reaction of Suzuki-Miyaura between arylboronic acids and aryl halides. Chemical structures of the compounds were characterized by $^1$H NMR and the liquid crystalline properties where analyzed by DSC and POM. Results indicate that these new azocompounds develop multiple transitions in large temperature ranges; the observed *Schlieren* and *focal-conic fan* textures (Figure 1) are typical of nematic and smectic liquid crystalline phases.

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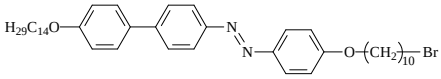


a) 175 °C b) 180 °C c) 190 °C

**Figure 1.** POM textures of the azocompound showed above.

(1) C.J. Barret, J. Mamiya, K.G. Yager, T. Ikeda, *Soft Matter*, **2007**, *3*, 1205-1320.
(2) C. Cojocariu, P. Rochon, *Pure Appl. Chem.*, **2004**, *76*, 1479-1497.