Azo polymers are a broad group of materials containing N = N azo groups in the chemical structure. During three decades, these polymers have been intensively studied for applications in photonics and optoelectronics. Exposure of azo-polymer layers with polarized light generates dichroism, photoinduced birefringence, diffraction gratings and surface relief grids (SRG) in the material. All these light-induced effects result from the selective absorption and repeated trans-cis-trans isomerization of azobenzene moieties. A polarized laser beam can also generate macroscopic polymer movement observed as bending of thin free polymer films (so-called Photomechanical Effect). The amount of bending angle of the polymer film depends on many factors, min. sample dimensions, exposure conditions, type of polarization of light (perpendicular or parallel to the long axis of the polymer film) and chemical structure of azo polymers. The photomechanical effect is well known for liquid crystal materials and elastomers that were used to build micropipettes, light-driven micromotors, polymer oscillators, or "azo robots". In recent years, the photomechanical effect has also been observed in azo amorphous polymers, i.e. homo and copolyimides, polyamides, polyamide acids.

The aim of this project is to elucidate the structure-properties relationships of functionalized azopolyimide, “guest-host” azosystems and azo blends. The results obtained in this project may also allow formulating some general relationships between the chemical architecture of new (azo)materials and *cis-trans*/*trans-cis* isomerization, mechanical properties and photomechanical properties, which would enable the modeling of chemical structure to obtain materials with required characteristics for specific applications. Our investigations have both cognitive and application aspect that will contribute to the extension of knowledge concerning the type of compounds investigated which may lead to the development of new materials with defined properties for the preparation of photonic and optoelectronic devices.