

Novel Polymer Architectures for Optical Storage by Holography

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This lecture spans 17 years of research on materials for optical information storage. Focus will be on materials' requirements, developments and merits as well as the optical storage achievements. I'll walk through a plethora of different azobenzene LC side-chain polyesters that were our original workhorses where especially the materials design flexibility will be elaborated. In addition, the application of various other azobenzene containing polymer architectures will be illuminated. A number of important issues like polarization holography, holographic stability, sensitivity, diffraction efficiency, and surface roughness, polymer segmental mobility etc. will be addressed. All these materials were investigated for 2-dimensional (2-D) holographic storage. From an application device side this culminated with the construction of a holographic memory card system. The latest trend in optical storage points to development of materials capable of 3-D holographic storage. Thus the final part is devoted to our most recent contributions in this area by use of atom transfer radical polymerization (ATRP) to produce azobenzene block copolymethacrylates and the holographic storage implications by use of these.