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# Stimuli-responsive hydrogels containing liquid crystals

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Polymer hydrogels are cross-linked hydrophilic polymers that generally absorb and hold substantial amounts of water. They find numerous applications in medicine, pharmacy and other fields. In this work we will use different types of polymer networks using acrylate and methacrylate monomers, and different crosslinkers, in order to obtain polymeric gels with changing capacity of retention of isotropic solvents like water, acetone, methanol, …..and anisotropic solvents like liquid crystals.
The polymer gels were elaborated under UV-curing of monomer mixtures in the presence of a photoiniator. A certain number of the properties of the gels like their hydrophilic behaviour, architecture, elasticity, and glass transition temperature were modified by choosing appropriate conditions. We are also interested to synthesize and study interpenetrate and semi interpenetrate networks because of their good capacity of absorption.
Kinetic studies of swelling and drying the polymer gels in different media yield information of the quantity of absorbed solvent with time. A particular interest is given to the studies of retention and release of liquid crystal and some isotropic solvents.
In the present communication we describe two ways to prepare polymer gel/LC systems : The first one is to elaborate the polymer network separately and swell it with the liquid crystal, and the second way is to polymerize the initial monomer mixture together with the liquid crystal. Our system in this work contains the n-Butyl-Acrylate (ABu) as a monomer and 1,6-Hexane-Diol-Di-Acrylate (HDDA) as a crosslinker, the liquid crystal used is 4-cyano-4'-n-pentyl-biphenyl (5CB), and the photoinitiator is Darocur 1173. Different techniques were used to characterize the dry and swollen polymer gels, like dielectric spectroscopy, rheology, differential scanning calorimetry (DSC), and polarised optical microscopy (POM).

**References**

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