

Liquid crystalline cellulose-based responsive materials

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Hierarchical cellulose nano, micro and meso structures make the structural support of plants being the self-assembly of cellulose units vital to the plants particularly in dead tissues. Some plants depend on the response of these structures to humidity to disperse their seeds [1]. Cellulose nano rods that can be isolated from different tissues of the plants have not the same characteristics but if the experimental conditions are well selected liquid crystalline order in water can be displayed. In this talk cellulose-based films and fibers responsive to water are obtained from liquid crystalline systems and characterized by several techniques, which include scanning electron microscopy (SEM), polarized optical microscopy (POM) and mechanical essays. The properties of the materials produced are compared with cellulose anisotropic structures existing in plants [3]. Particular attention will be dedicated to helical micro/filaments and ribbons, essentially formed by cellulose that can be isolated from plant petiole tracheary elements and dead tissues [3]. Relations between morphology/properties are made in order to use the cellulose/micro-nano structures for soft responsive materials.

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