

Liquid crystals based biosensors

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Liquid crystalline materials are being increasingly considered in a wide range of sensing and in particular in the biosensing field. The arrangement or the orientation of liquid crystals (LCs) is highly sensitive to interfacial molecular events; such events can lead to changes in the optical appearance of the LCs. For example, LCs respond to and amplify small changes in temperature, shear, and electric/magnetic fields of solid surfaces, with which they are in contact. This qualifies LCs as 'molecular magnifying glasses', allowing events that occur on the nanoscale to be observed by a naked eye (and far-field optics), without the need of additional instrumentation. In addition, LC-based methods have reportedly offered potential advantages over conventional techniques because they do not require complex instrumentation or labelling. Modern research is being conducted in search of rapid, point of care diagnostics for the early detection of several diseases.

In the lessons, the general description of what a biosensor is will be exploited from fundamental aspects to commercial devices. The contribution of LCs in the field will be highlighted in for different case studies.