

Bio-reactive hydrogel and IOL fabrication by biomolecule implantation and detection module optimization

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Hydrogels with a three-dimensional cross-linked network structure and high water content are attractive properties for biological materials. Of particular interest are those stimuli responsive “smart hydrogels” that can undergo a reversible and volume phase transition in response to external stimuli, such as temperature, pH, light and even electrical or magnetic field. In recent study in smart hydrogel materials, biological responsiveness by changing properties in response to selective biological recognition. When exposed to a biological target such as protein, antibody, enzyme or aptamer, molecular interactions caused by recognition of biomolecules that translate into morphology, volume phase, color change responses occur. When the biomarker is reacted with the free antigen on the printed hydrogel, a slight volume change of the hydrogel occurs due to the difference in binding affinity. We are going to measure these minute volume changes by detecting moire signal changes.