BioSyM Seminar Series 2018

Strain-sensitive stretchable mechanochromic hydrogel

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Venue : Level 5, Perseverance Room

Abstract

Mechanochromic materials have gained more attention recently due to their wide application in force sensing, pressure sensing, encryption and color display. Particularly, hydrogel based materials, with their good transparency, tunable mechanical property and water compatibility, are good candidate for mechanochromic devices. Current mechanochromic hydrogels are mostly based on the photonic effect. Nevertheless, these photonic gels shows inconsistent angular-dependent mechanochromism and the fabrication processes are usually complicated. We here present a facile method to fabricate strain-sensitive mechanochromic hydrogels based on a double layer design with top layer carbon dot (CD) hydrogel served as a blue emission layer and UV modulator and the bottom layer lanthanide hydrogel served as a mechanochromic layer. Tunable mechanochromism can be achieved simply by tuning the concentration of CD or non-luminescent absorber in the top layer. A model is proposed to predict the mechanochromism of these hydrogels based on the Beer-Lambert Law and the strain theory of elastic materials.

Short Biography

Qingdi joined SMART-BioSym in 2015 as a postdoctoral researcher in Prof. Krystyn Van Vliet's group. He got his doctoral degree from Department of Biomedical Engineering, NUS and was working as a postdoc in the Department of Chemical and Biomolecular Engineering, NUS, before joining SMART. His research interests include soft materials, luminescent materials, biosensors, biochips and microfluidics. His current study in SMART focuses mainly on the development of novel stretchable and luminescent hydrogel with optical response to chemical and physical stimuli.