

Numerical simulation on multi-stimuli responsive behaviors of photo-sensitive hydrogel

†*Xiao Chen, Hua Li, and Khin Yong Lam

School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore

*Presenting author: xchen028@e.ntu.edu.sg

†Corresponding author: xchen028@e.ntu.edu.sg

Abstract

This paper presents a theoretical model to account for the photo-sensitive hydrogel based extracellular matrix (ECM) in response to light-temperature-pH coupled stimuli. It is reported that the cell adhesion might be largely determined by the water content and electrostatic interaction of ECM. Therefore, the study focuses on the hydration and electrical states of photo-sensitive hydrogels to explore the possible adhesion change subject to different external conditions. The simulation results may be helpful to design the multi-stimuli responsive ECM and generate some potential applications, such as photo-electrode and photo-controlled drug release.

Keywords: Photo-sensitive hydrogel, multi-stimuli responsive, theoretical model, light-temperature-pH coupled stimuli