

On the several Multi-physics models in simulation of transient nonlinear behaviors of stimuli-responsive polymer hydrogels in BioMEMS

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Three multi-physics models were developed or presented to predict the transient nonlinear behavior of actuators/sensors based on stimuli-responsive polymer hydrogels. A true meshfree, implicit numerical scheme was conducted to solve the coupled transient nonlinear partial differential governing equations. For the developed models involving chemo-electro-mechanics, the transient responds of electric-sensitive hydrogels including the membrane deformation, ionic concentrations and electric potentials interior and exterior the membranes are numerically simulated and compared. And the parameters having important influence on the transient hydrogel deformation are also investigated.

Biography

Yuan is a research assistant professor in the Biomedical Engineering Department at University of Florida. He received his PhD degree in Mechanical Engineering from University of Science and technology of China in 2002. Before joined University of Florida, he had worked as a postdoc fellow in National University of Singapore between 2002 and 2004 and later as a postdoc scientist with Clemons University in 2005. His academic investigation is focused on cutting-edge research and development in laser and ultrasound-related biomedical technologies including biomedical imaging and signal processing/spectroscopy, biomedical optics, bioMEMS, computational engineering, neuroengineering and nanomedicine. He, as the principal or co-investigator for the above research activities, has achieved national and international recognition through more than 45 publications in high ranked journals and over 1000 extensive citations. He was selected to be an active reviewer for over 30 top journals. He is a guest associate editor of Medical Physics and Applied Optics, and an editorial board member of Journal of Biosensors and Bioelectronics. He is a senior member of OSA and member of SPIE.

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