Seminar

Department of Biomedical Engineering
香港城市大學
City University of Hong Kong

Micropatterned liquid metal for stretchable bio-electronics

Xingyu Jiang

Southern University of Science and Technology
Shenzhen, China

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Abstract

We combine microfluidic fabrication with liquid metal (based on Gallium) encapsulated in elastic polymers to achieve stretchable and biodegradable electronic circuitry which can meet clinical needs of interfacing human tissues with electronics. Conductive inks made from lipid metals-polymer composites (MPC) can be encapsulated within elastomer-based microfluidic channels that serve as conducting wires that are flexible, stretchable and completely biodegradable. MPCs are applicable to biochemical assays, pharmaceutical screening and conformal devices that can adhere to and measure electrical/chemical signals of human organs. By being completely biocompatible and stretchable, MPCs integrate seamlessly with living tissues. These properties can dramatically expand the capability of electronic devices as biomedical sensors, as well as actuators for controllable movement of cells and gene therapy. MPC-based epidermal electronics, such as blood oxygen sensors and sweat detection devices, allow real-time health monitoring. Implanted MPCs can form “electronic blood vessels” that integrates sensing with regeneration in model animals. Electrophysiological measurement such as EEG ECG EMG can be conveniently measured over long periods of time.

Biography

Xingyu Jiang is a Chair Professor at the Southern University of Science and Technology, Shenzhen, China. He obtained his B.S. at the University of Chicago in 1999 and his Ph.D. at Harvard University in 2004. In 2005, he started a lab at Chinese Academy of Sciences. In 2018, he moved to the Department of Biomedical Engineering of the Southern University of Science and Technology. He has published more than 400 peer-reviewed papers. His research has been recognized by many awards and supported by a number of funds, including National Science Foundation of China’s Distinguished Young Scholars Award, the Scopus Young Researcher Gold Award, and the Human Frontier Science Program Young Investigator Award. He is a Fellow of the Royal Society of Chemistry (UK) and the American Institute of Medical and Biological Engineering.