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Micro-structures fabricated by SLA 3D printing to enhance the electrochemical effects of supercapacitors

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In this study, SLA (Stereolithography) method was used to fabricate three-dimensional micro-structures. A soft polymer such as PDMS (Polydimethylsiloxane) was used as a mold to duplicate the pattern of the micro-structures. Polyaniline (PANI) films with micro-structures on the surface using PDMS molds were prepared as electrodes of supercapacitor. A specific capacitance 391 F/g at a of 1 A/g was measured for the PANI micro-structures, while the specific capacitance of PANI plane is 304 F/g. To achieve higher energy storage, laser interference lithography was employed to fabricate nano-structures on the micro-structures. The specific capacitance 487 F/g was obtained for the micro/nano hierarchical structures due to increase in the surface of PANI electrodes.

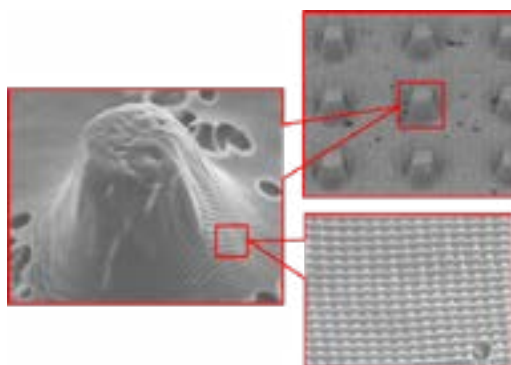


Figure 1: Hierarchical structures fabricated by SLA 3D printing and laser interference lithography.

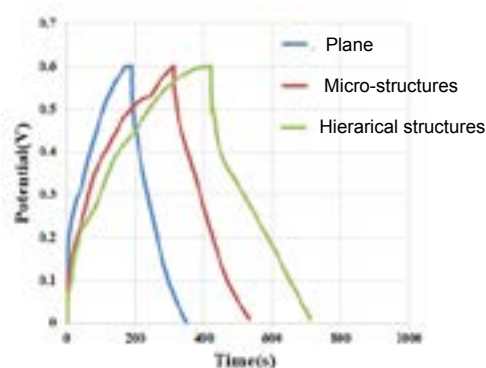


Figure 2: Charge-discharge cycling curves of the different PANI electrodes at a current density of 1 A/g

Biography

Jiun Hong Liu is studying at the Institute of Mechanical Engineering in Chung Yuan Christian University, Taiwan. His major research is in Optomechanics.

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