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Micropatterning Polypyrrole Conducting Polymer by Pulsed Electrical Discharge

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Abstract

Polypyrrole and other conducting polymers are of interest in actuators, sensors, energy storage devices and organic electronics. The patterning of these polymers can be challenging, particularly polypyrrole due to its insolubility. This paper reports the first micropatterning of polypyrrole using high-frequency pulses of extremely miniaturized electrical discharge. Microstructures with surface roughness of 70nm are produced in the polymer with sub-micron depth control. Patterning of polypyrrole film deposited on a commercial medical catheter is demonstrated toward enabling smart catheters that use the patterned film as integrated actuators. This novel micropatterning capability opens up new possibilities for polypyrrole and likely other polymers, promoting micro-device applications for them.

Keywords

Author Keywords: actuators; conducting polymers; micropatterning; polypyrrole; pulsed discharge

KeyWords Plus: SELF-ASSEMBLED MONOLAYERS; ACTUATORS; LITHOGRAPHY; ENHANCEMENT; EDM

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