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FLEXIBLE, STRETCHABLE AND HEALABLE ELECTRONICS

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Organic electronics based on semiconducting and conducting polymers have been extensively investigated in the past two decades and have found commercial applications in lighting panels, smartphone and TV screens using OLEDs (organic light emitting diodes) technology. Many other applications are foreseen to reach the commercial maturity in future in areas such as transistors, sensors and photovoltaics. Organic electronic devices, apart from consumer applications are paving the path for key applications at the interface between electronics and biology such as in polymer electrodes for recording and stimulating neural activity in neurological diseases. In such applications, organic polymers are very attractive candidates due to their distinct property of mixed conduction: the ability to transport both electron/holes and ionic species. Additionally, conducting polymers offer the possibility to tune their surface properties (e.g., wettability or chemical reactivity) by changing their oxidation state, thus promoting or hindering the adhesion of biomolecules. This feature can be particularly useful for enhancing the biocompatibility of implantable electrodes. My talk will deal with processing and characterization of conducting polymer films and devices for flexible, stretchable and healable electronics. I will particularly focus on micro-patterning of conducting polymer films for flexible and stretchable devices and on healing of conducting polymer films.

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