

Skin-inspired Organic Electronics

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Skin is the body's largest organ. It is responsible for the transduction of a vast amount of information. This conformable, stretchable, self-healable and biodegradable material simultaneously collects signals from external stimuli that translate into information such as pressure, pain, and temperature. The development of electronic materials, inspired by the complexity of this organ is a tremendous, unrealized materials challenge. However, the advent of organic-based electronic materials may offer a potential solution to this longstanding problem. Over the past decade, we have developed materials design concepts to add skin-like functions to organic electronic materials without compromising their electronic properties. These new materials and new devices enabled arrange of new applications in medical devices, robotics and wearable electronics. In this talk, I will discuss basic material design concepts for realizing stretchable, self-healable and biodegradable conductive or semiconductive materials. I will discuss our methods for scalable fabrication of stretchable electronic circuit blocks. Finally, I will describe a few examples of applications we are pursuing uniquely enabled by skin-like organic electronics when interfacing with biological systems.

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