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Advancing the Frontiers of Silk Fibroin Protein-based Materials for Futuristic Electronics and Clinical Wound-Healing (Invited Review)

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Abstract

The present review will introduce the basic concepts of silk-based electronics/optoelectronics including the latest technological advances on the use of silk in combination with other functional components, with an emphasis on improving the performance of next-generation silk-based materials. It also highlights the patterning of silk fibroin to produce micro/nano-scale features, as well as the functionalization of silk fibroin to impart antimicrobial (i.e. antibacterial) properties. Silk-based bioelectronics have great potential for advanced or futuristic bio-applications including e-skins, e-bandages, biosensors, wearable displays, implantable devices, artificial muscles, etc. Notably, silk-based organic field-effect transistors have highly promising applications in e-skins and biosensors; silk-based electrodes/antennas are used for *in vivo* bioanalysis or sensing purpose (e.g.,

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