丝素蛋白基导电水凝胶制备与表征

摘　要

水凝胶因其独特的溶胀能力在灭火、医学工程、柔性传感器等领域应用广泛，而导电水凝胶综合了水凝胶本身的性能和导电性，拓展了水凝胶在智能化和电子化方面的应用。本文综述了水凝胶的发展现状，并对水凝胶复合制备的多样化及其催生的导电复合水凝胶的发展现状进行了阐述。本文设计采用碳纳米管作为复合材料通过电泳沉积制备丝素蛋白基导电水凝胶，并对水凝胶的机械性能、形貌结构和导电性能进行测试，探寻最合适的配比，以改善丝素蛋白水凝胶机械性能不足的缺点并赋予其导电性，为天然可再生材料的科技化应用以及蚕丝的智能化发展提供一个方向。

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关键词　水凝胶；丝素蛋白；碳纳米管；力学性能；导电性能

ABSTRACT

Hydrogels are widely used in fire extinction, medicine engineering, flexible sensor and other aspects due to their unique swelling capacity, and conductive hydrogels integrate the unique properties of hydrogels and conductivity, which expanding the application of hydrogels in intellectualization and electronization. In this paper, the development of hydrogels was reviewed, and the diversification of hydrogels composite preparation and the development of conductive composite hydrogels were described. The conductive hydrogels based on silk fibroin were prepared through adding carbon nanotube to the silk fibroin hydrogel as reinforced materials by electric crosslinking. And in order to improve the mechanical properties of silk fibroin hydrogels and give it electrical conductivity, the most suitable ratio was explored by testing its mechanical properties, structure and electrical conductivity, which provides a good method for promoting the scientific application of natural renewable materials and the intelligent development of silk.

KEYWORDS conductive hydrogel silk fibroin carbon nanotubes mechanical property conductivity

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