Cu_xO Nanowires-based Ionovoltaic Device for Droplet-Flow-Induced Electrical Energy Generation

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Current approaches for electrical energy generation driven by ion dynamics at a liquid-solid interface including ionovoltaic devices have been received great interest. The factors that affect the performance of the ionovoltaic device include the properties of a water droplet, the structure of the device, and other variables. However, research on the semiconductor resistance of the ionovoltaic device has not been studied. Herein, we employed Cu_xO nanowires mesh as semiconductor and investigated the influence of the resistance on the device. The resistance of the Cu_xO nanowires mesh can be controlled as the carrier concentration changes with different heating temperatures. The results revealed that the resistance of semiconducting Cu_xO nanowires mesh became larger as the carrier concentration increased, and improved the performance of the device. Moreover, we enhanced structural stability by fabricating a flexible ionovoltaic device using a polyimide substrate. Our research extends the understanding of semiconductor in ionovoltaic devices and the flexible construction has become applicable to various environments.