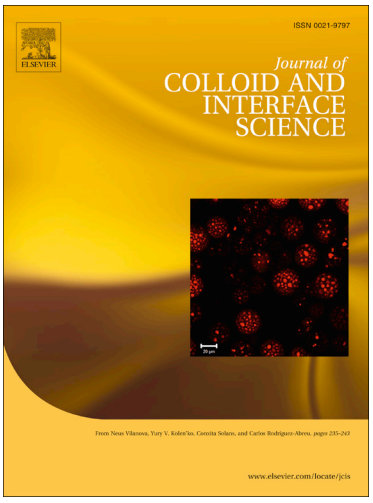

Flexible hybrid yarn-shaped supercapacitors based on porous nickel cobalt sulfide nanosheet array layers on gold metalized cotton yarns

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Abstract: A high-performance yarn-shaped supercapacitor electrode material with light weight, small volume, flexibility and low cost, is highly desirable for the development of flexible energy storage devices. Herein, a cotton/Au/nickel cobalt sulfide hybrid yarn electrode was designed and synthesized by electrodepositing nickel cobalt sulfide nanosheet arrays on the Au metalized cotton yarn. The metalized cotton yarn as a conductive substrate ensures rapid electron transportation. The porous layer which constructed by $CoNi_2S_4$ nanosheet arrays significantly enlarges the interface between the electrolyte ions and electrode materials, providing large electroactive surface area for the faradic redox reactions. The hierarchically porous structure of entire yarn electrode shortens the electrolyte diffusion path. A synergistic