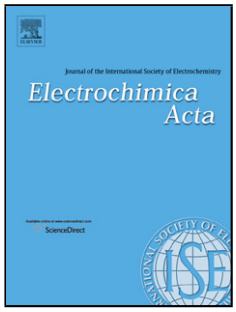

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Polypyrrole doped with dodecyl benzene sulfonate electrodeposited on carbon fibers for flexible capacitors with high-performance

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Highlights

- PPy has been deposited on carbon fibers to form flexible PPy/DBS/CF composites.
- The performances of flexible capacitors based on PPy/DBS/CF have been evaluated.
- The flexible capacitors in LiCl/PVA electrolytes have excellent cyclic stability.

Abstract

Polypyrrole (PPy) doped with large counter anion of dodecyl benzene sulfonate (DBS) has been electrodeposited on carbon fibers to obtain the composite of PPy/DBS/CF, and the preparation conditions for the flexible composites have also been optimized. The microstructures of PPy/DBS/CF composites are observed by scanning electron microscope, and the electrochemical properties of the composites are investigated by using electrochemical techniques. The flexible wire-shaped electrochemical capacitors can be fabricated conveniently by using composites of PPy/DBS/CF as electrodes, and the performances of the flexible capacitors are evaluated by cyclic voltammetry, galvanostatic charge/discharge and electrochemical impedance spectroscopy methods in different polyvinyl alcohol (PVA)-based gel electrolytes. The results show that the electrolytes have significant influence on the capacitors' performances. The specific capacitance of PPy/DBS/CF can reach to about 29.0 mF cm^{-1} when $LiClO_4$/PVA and LiCl/PVA are used as electrolytes. The

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