Cocoon derived nitrogen enriched activated carbon fiber networks for capacitive deionization

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Cocoon derived nitrogen enriched activated carbon fiber networks for capacitive deionization

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Abstract

Capacitive deionization (CDI) has been attracted great interest as an emerging desalination technology and the electrode materials play a critical role on improving CDI performance. In this work, nitrogen-enriched activated carbon fibers (AN-CFs) were prepared from the natural based silk cocoon through simple carbonization and CO_2 activation. Their electrochemical and electrosorption behaviors were studied in NaCl solution. The results show that AN-CFs exhibit a fibri form porous structure with rich nitrogen element and CO_2 activation enhances their specific surface area. Compared with unactivated nitrogen-enriched carbon fibers (196.05 F g^{-1} at 1 mV s^{-1}, 12.02 mg g^{-1} in 1000 mg l^{-1} NaCl solution), AN-CFs exhibit more excellent capacitive (236.03 F g^{-1}) and CDI (16.56 mg g^{-1}) performances, showing that CO_2 activation is proved to be an effective method to improve electrochemical and electrosorption performances and the AN-CFs should be a promising electrode material

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