

Facile spray pyrolysis synthesis of macroporous Ti-doped MoO₂-C microspheres and their applications in electrochemical energy storages

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Ultrasonic spray pyrolysis is an attractive way to create high purity homogeneous structures with spherical geometry. In addition, since the ultrasonic spray pyrolysis system operates continuously, mass production is possible. In this study, we directly synthesized ordered macroporous Ti doped MoO₂-C microspheres using ultrasonic spray pyrolysis without conventional reducing agents such as hydrogen gas or ethylene glycol. Ti dopant played a role of reducing agent as well as enhancing phase stability of MoO₂ structure in atmosphere, as Ti can affect the binding strength of oxygen atoms in MoO₂ structure. Polystyrene (PS) beads as soft templates and dextrin as carbon source were used for fabrication of ordered macroporous structures. The synthesized ordered macroporous Ti doped MoO₂-C materials were applied to electrodes of supercapacitors and showed high efficiency compared to conventional activated carbon materials.