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Synthesis and electrochemical characterization of mesoporous Li_2FeSiO_4/C composite cathode material for Li-ion batteries AJAY KUMAR, Wayne State University, O.D. JAYAKUMAR, Bhabha Atomic Research Centre, KHADIJE BAZZI, GHOLAM- ABBAS NAZRI, Wayne State University, VAMAN M. NAIK, University of Michigan Dearborn, RATNA NAIK, Wayne State University — Lithium iron silicate (Li_2FeSiO_4) has the potential as cathode for Li ion batteries due to its high theoretical capacity ($\sim$ 330 mAh/g) and improved safety. The application of Li_2FeSiO_4 as cathode material has been challenged by its poor electronic conductivity and slow lithium ion diffusion in the solid phase. In order to solve these problems, we have synthesized mesoporous Li_2FeSiO_4/C composites by sol-gel method using the tri-block copolymer (P123) as carbon source. The phase purity and morphology of the composite materials were characterized by x-ray diffraction, SEM and TEM. The XRD pattern confirmed the formation of $\sim$ 12 nm size Li_2FeSiO_4 crystallites in composites annealed at 600 °C for 6 h under argon atmosphere. The electrochemical properties are measured using the composite material as positive electrode in a standard coin cell configuration with lithium as the active anode and the cells were tested using AC impedance spectroscopy, cyclic voltammetry, and galvanostatic charge/discharge cycling. The Li_2FeSiO_4/C composites showed a discharge capacity of $\sim$ 240 mAh/g at a rate of C/30 at room temperature. The effect of different annealing temperature and synthesis time on the electrochemical performance of Li_2FeSiO_4/C will be presented.

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