Synthesis and Electrochemical Properties of Doped Tin $\text{Fe}_2(\text{MoO}_4)_3$ as Cathode Material for Sodium-Ion Batteries

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$\text{Fe}_{2-x}\text{Sn}_x(\text{MoO}_4)_3$ samples were successfully synthesized by wet chemical route. The analytical results of X-ray diffractions indicated that the additions of tin have not destroyed the lattice structure of $\text{Fe}_{2-x}\text{Sn}_x(\text{MoO}_4)_3$, but increased the units cell volume. $\text{Fe}_{2-x}\text{Sn}_x(\text{MoO}_4)_3$ can be exhibited higher discharge /charge capacities and better cycle-stability than the pristine one. At room temperature, the initial discharge capacity of $\text{Fe}_{1.95}\text{Sn}_{0.05}(\text{MoO}_4)_3$ is 83.12 mAh g^{-1} at a discharge rate of 0.5 C and remains 78.81 after 50 cycles. The improved electrochemical properties can be explaining with the presence of tin in the lattice of $\text{Fe}_2(\text{MoO}_4)_3$ by improved the structure stability and electrical conductivity.

Keywords: NASICON. Sn doped. Iron molybdate. Cathode materials. Sodium-ion battery.

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