Application of a Cross-linked Polyacrylic Acid- Polyethylene Oxide (PAA-PEO) Copolymer as a Binder for Si@C@PDA Composite Anode Materials in Li-ion Batteries

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Received: 9 September 2021 / Accepted: 17 November 2021 / Published: 5 January 2022

In this paper, a PAA-PEO cross-linking binder was prepared by the copolymerization method and used in Si@C@PDA composite anode materials for Li-ion batteries. The phenolic hydroxyl in PAA-PEO and the hydroxyl in the self-polymerized PDA on the surface of Si@C can form a three-dimensional cross-linking binding system with strong hydrogen bonds. Compared with the traditional binder, PAA-PEO has higher adhesion and conductivity. The structure of Si@C@PDA-PAA-PEO was successfully determined by IR and XPS. The electrochemical results show that PAA-PEO can significantly improve the cycle stability of the Si@C@PDA composite negative electrode material, and can maintain a 600 mAgh⁻¹ stable cycle 200 times under a 1000 mAgh⁻¹ current density, and the first coulombic efficiency is 89.4%.

Keywords: Li-ion battery, Crosslinking binder, dopamine, electrochemical properties.

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