Si nanoparticles embedded polystyrene by emulsion polymerization for enhanced Initial Coulombic efficiency of Si based Li ion batteries

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Si anode has a severe problems such as volume expansion and poor electrical contact, For solving these problems. Core-shell structure having designed void spaces was introduced and showed good cycle stability. But this structure exhibited low initial columbic efficiency of 60% due to high surface area. In this work, we propose Si embedded structure using Si embedded polymer particles. Multiple Si embedded core-shell structure inside a carbon shell can get low surface areas and showed high initial columbic efficiency of 80%. The initial columbic efficiency depended on the Si amount inside of shell. we expect our design process for confining active materials inside the shell to be applicable to other materials that can eventually be used as high-performance anodes for the next generation LIBs.