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Advances in Alloy Negative Electrodes for Li-ion Batteries (I)

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There are a number of opportunities to increase Li-ion battery energy density. At the negative electrode, Si alloys can store much more lithium than graphite, which is currently in use. As a result, utilizing Si alloys in Li-ion cells has been shown to increase energy density by about 20%. However, there are many challenges for the utilization of Si alloys in practical Li-ion batteries. These are primarily related to internal phase changes within the alloy during lithium insertion, the volume expansion encountered during lithium insertion and interactions at the alloy surface with battery electrolyte. Advances in materials, electrolytes, electrode formulations and binders for enabling the use of Si alloys in practical cells will be discussed.

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