

## A detailed analysis of methylated silicon as an improved electrode material for lithium batteries

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Silicon is an attractive anode material for Li-ion batteries due to its high theoretical charge capacity. However, a severe limitation of this material comes from the very large swelling accompanying the incorporation of Li ions.

Thin films of amorphous methylated silicon were shown to accommodate the volume changes due to lithiation / delithiation cycles more easily than pure-silicon ones, leading to a better cyclability of the negative electrodes based on this material [1].

We present a detailed study of the evolution of this material during lithiation/delithiation by complementary in situ and ex situ techniques : electrochemical measurements, IR, ToF-SIMS, optical microscopy, AFM. Our results give a detailed insight into the lithiation mechanisms involved in pure and methylated amorphous silicon.

[1] L. Touahir et al., J. Power Sources 240 (2013) 551-557.