

# CONFÉRENCES DE CHIMIE AUTOMNE 2017



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## “Silicon-based anode materials for lithium-ion batteries”

RÉSUMÉ: In this talk, two nano-morphological strategies for Si are explained. One of them is the arrangement of buffering space around Si to narrow Si expansion without structure destruction. We have experimentally demonstrated that the optimum size of the buffer space is approximately 3 times larger than the Si volume. The buffer space can be formed by using silica layer formed on the surface of Si as a sacrificial porogen to be dissolved away. We have developed also another way, direct reduction of SiO<sub>2</sub> which is wrapped with carbon layer into Si nanoparticles. However, the buffer-space strategy is costly and has a limitation for long term cycling stability. Thus, we have developed another strategy in which Si intense structural change is allowed during charge/discharge cycling but induced toward a desired form, which is named ‘wrinkled structure’, i.e., a low density porous structure consisting of nanofibrous framework. We have clarified the key factors to induce this self-organization; Si nanomorphology, carbon coating, and lithiation degree of Si. Based on this strategy, we have developed an industrially sound mass production method of high-performance Si anode materials from waste Si sawdust.

- > Mercredi 18 octobre 2017
- > 11:00
- > Salle **1035**  
Pavillon J.-Armand Bombardier

> **BIENVENUE À TOUS !**

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Faculté des arts et des sciences  
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Merci à nos commanditaires

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