

# **Sodium storage in hard carbon materials – from fundamentals to battery applications**

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Sodium-ion batteries are currently emerging as an alternative to lithium-based batteries. Disordered, non-graphitizable carbon materials, also known as hard carbons, are commonly used as negative electrodes in sodium-ion batteries. After a short technology context, this lecture will introduce some key concepts associated with the electrochemical storage of sodium in hard carbons. Sodium storage mechanisms will be presented while experimental results will be shown and discussed for hard carbon materials produced by the pyrolysis of renewable precursors. Electrochemistry, microscopy and structural information data will be discussed and an overview of the current state-of-the-art of sodium-ion batteries will be given.