

# RECENT FINDINGS IN SODIUM BATTERY ELECTRODE MATERIAL TESTING

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Sodium metal anodes are widely used as counter (or also reference) electrodes in the so termed *half cell* tests, performed mostly at laboratory scale to assess the electrochemical performance of a given compound avoiding the assembly of *full cells* in which electrode balancing can severely affect performance. The reliability of extrapolating such half cell testing results to potential performance in full cells relies on the stability of the Solid Electrolyte Interphase (SEI) formed on the surface of sodium metal anodes as a result of electrolyte degradation reactions.

A comparative study of the composition, morphology and stability of the SEI formed on lithium and sodium metal anodes with state-of-the-art electrolytes using a range of techniques will be presented. The impact of the use of metal anodes (Li or Na) in half cell configuration on the impedance of a standard carbonaceous negative electrode (hard carbon, HC hereafter) was also discussed. Our results clearly point at the existence of significant differences which cast some doubts on the representativity of half-cell tests and call to exercise care in the interpretation or extrapolation of their results.<sup>1</sup>

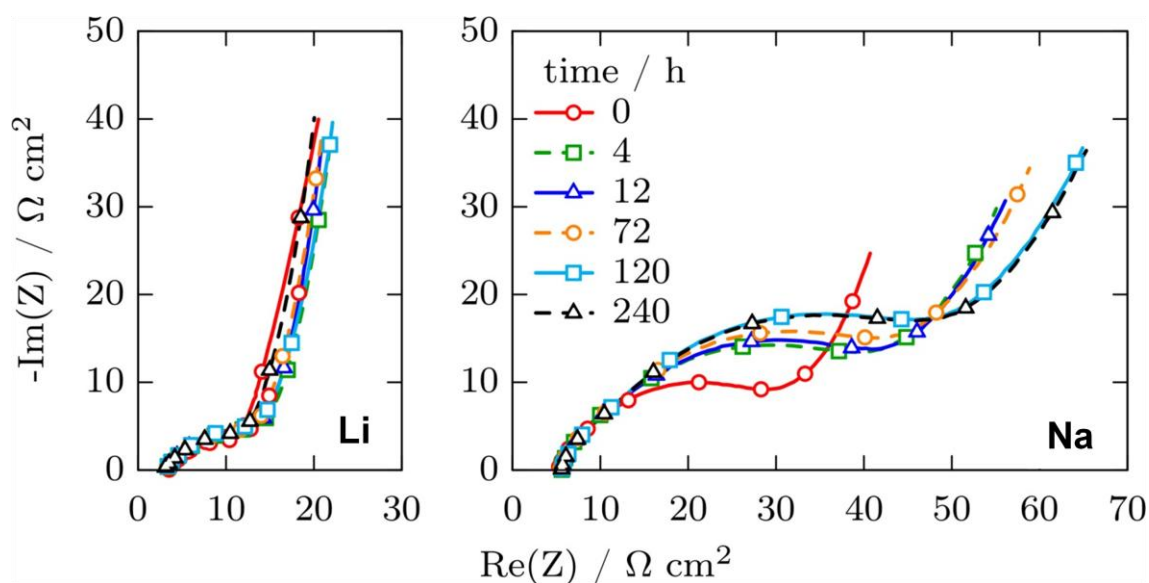


Figure 1. Impedance of hard carbon measured on the 500 kHz to 10 Hz frequency range in 3 electrodes configuration with reference and counter electrodes of metal M, at different times of storage in open circuit. In (a): M = Li, electrolyte is LP30; in (b): M = Na, electrolyte is 1M NaPF<sub>6</sub> in EC<sub>0.45</sub>PC<sub>0.45</sub>DMC<sub>0.1</sub>.

## References:

- [1] D. Iermakova, A. Ponrouch, R. Dugas, M.R. Palacín. J. Electrochem. Soc. doi: 10.1149/2.0091513jes J. Electrochem. Soc. 162 (2015) A7060-A7066.