

Modifying composition of the SEI layers of calcium electrodes

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The structure and composition of the SEI layers formed on metal anodes is a key factor enabling fast and reversible anodic reactions in battery technologies. This is especially important for the multivalent battery technologies, which despite their high energy content and promising performances, still lack a sufficiently conductive layers for calcium or magnesium ions. Therefore, it is necessary to achieve an optimal ion conductive layer that will acquire desirable performances of the next generation multivalent batteries. The formation these layers depend on many operational parameters and conditions, most common being the composition of the electrolyte and the electrochemical approach of formation.

In this study, various approaches were employed in order to construct SEI layers on calcium electrode. Formed layers were electrochemically examined their ability to support reversible calcium deposition and stripping in previously selected organic electrolytes. The structural characterization of the formed layers was conducted by standard methods such as FTIR, XRD and SEM, providing comprehensive insight into the morphology and composition.

The results showcased a considerable influence of the electrolytes on the electrochemical behaviour of calcium electrode. It was found that it is possible to obtain a conductive SEI layer enabling reversible calcium deposition and stripping. This specific result expands the potential of possibilities for advancing the understanding and development of preferred SEI layer for highly reversible calcium electrode.

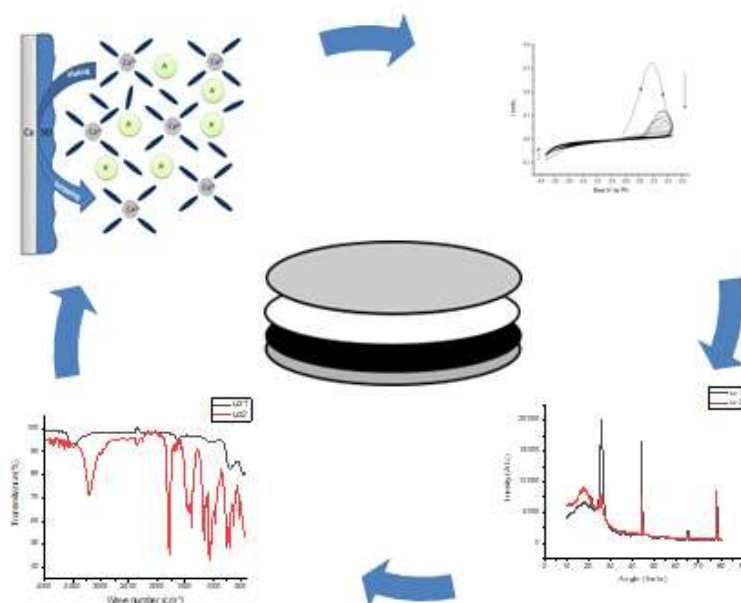


Figure 1. Schematic representation of modification procedure for calcium anode