

## STUDY BY ELECTRODE IMPEDANCE SPECTROSCOPY OF THE PROPERTIES OF LITHIUM SURFACE LAYERS IN APROTIC ORGANIC ELECTROLYTES (EXTENDED ABSTRACT)

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The surface layers formed on the lithium electrode under various conditions in different electrolytes, using 1,3-dioxolane or 2-methyltetrahydrofuran as solvent, and  $\text{LiClO}_4$ ,  $\text{LiAsF}_6$  or  $\text{LiPF}_6$  as solute, have been extensively studied.

The kinetic properties of the lithium electrode in presence of such surface layers were determined by electrode impedance spectroscopy leading to a clarification of the elementary conduction, transfer, and diffusion processes. An analysis of the characteristic parameters of the impedance diagrams, according to the theory of the frequency response of the binary electrolytes, revealed that the surface layers can have properties similar to those of liquid, solid, and/or polymer electrolytes. These properties, related to the importance of the varied inorganic and organic compounds constituting the surface layers, are essentially determined by the possible decomposition of the solute during the polymerization of the solvent.

The results led to the main conclusion that the lithium electrode can be successfully cycled when the values of the conductivity, the concentration, and the salt diffusion coefficient, which characterize the properties of the surface layer formed, appeared to be of the same order as those of the aprotic organic electrolyte.

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