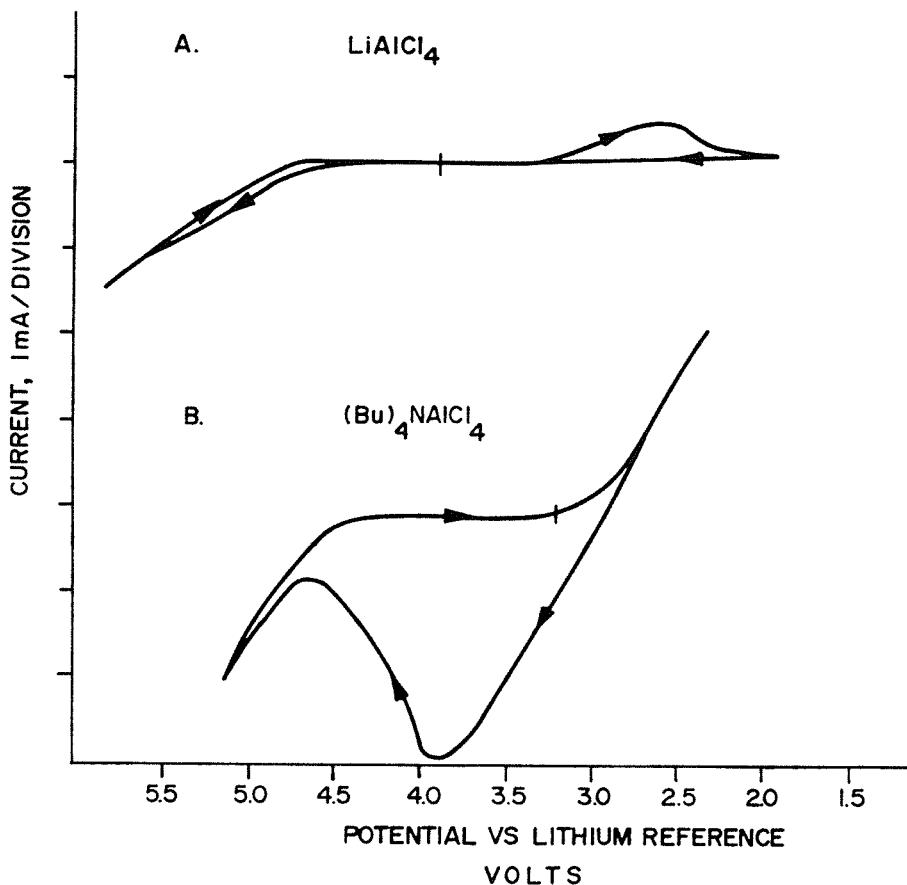



 C V N O T E S

**Sulfuryl Chloride Reduction**
**Cyclic Voltammetry at Smooth Carbon Electrodes in Non-Lithium-Based Electrolytes**


**Sample:**  $\text{LiAlCl}_4 \cdot 3\text{SO}_2$

**Rate:** 100 mV/s

**Electrode:** Vitreous Carbon Rod, 3 mm  
Diameter\*

**Ref:** Lithium

During reduction of sulfuryl chloride ( $\text{SO}_2\text{Cl}_2$ ) in electrolytes such as  $\text{LiAlCl}_4\text{-SO}_2\text{Cl}_2$ , chloride anions produced at the carbon cathode rapidly react with lithium cations (present in the electrolyte as soluble  $\text{LiAlCl}_4$ ) to form insoluble  $\text{LiCl}$ . This  $\text{LiCl}$  blocks the smooth electrode and limits current flow. In tetrabutylammonium tetrachloraluminate electrolyte, where no lithium cations are initially present at the carbon cathode, the chloride ion remains in solution as soluble tetrabutylammonium chloride.

Cyclic voltammograms at a smooth carbon electrode in the above electrolyte show: A. oxidation of soluble chloride ion to soluble molecular chlorine (at ~ 4 volts) B. relatively little passivation of the electrode during reduction as shown by the absence of limiting current (at ~ 2 volts)

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