resulting in the net discharge reaction

$$(xy)Li + [(CH^{+y})(ClO_4)^-_y]_x \rightarrow (CH)_x + (xy)LiClO_4 \quad (3)$$

The charge reactions one the reverse of the above. The cell shows many very good features such as good coulombic efficiency, high power density, flat discharge curves at useful discharge currents, very little change in discharge voltage when the discharge current was varied greatly, etc. However, the cell shows poor retention of charge on standing and poor recyclability. Hence p-doped polyacetylene, $[(CH^{+y})A^-_y]_x$ does not show promise as a useful cathode in a rechargeable battery of this type.

(B) <u>Use of $[M^+_y(CH)^{-y}]_x$ as an Anode</u> (See reprints 21 and 22).

Considerable interest has been shown in recent years in the use of a cell of the type

$$M \;/\; M^+A^-(THF) \;/\; TiS_2$$

(where M = Li or Na and M^+A^- is a salt of M) as a rechargeable battery. The anode discharge reaction is

$$xM \rightarrow xM^+ + xe^- \quad (4)$$

the corresponding cathode reaction being

$$(TiS_2)_x + xe^- \rightarrow (TiS_2^{-1})_x \quad (5)$$

resulting in the overall discharge reaction

$$xM + (TiS_2)_x \rightarrow [Li^+(TiS_2^-)]_x \quad (6)$$

The charge reactions are the reverse of the above.

A particular problem with this type of battery, common to all rechargeable batteries involving Li anodes (which are preferable to Na anodes because of their larger energy density) is the formation of Li dendrites on the Li electrode during charging, especially at high charging rates.

In the present studies, cells have been constructed in which the Li anode