

## ELECTROCHEMICAL PROCESS : APPLICATION TO FLUORINE CHEMISTRY\*

Nobuatsu Watanabe

Department of Industrial Chemistry, Kyoto University,  
KYOTO, 606 JAPAN

Many electrochemical studies have been made in the field of fluorine chemistry because of the high electronegativity, high reactivity, and high standard electrode potential of fluorine. Typical examples of such studies are of fluorine evolution reaction on metal or carbon electrodes, electrochemical fluorinations of many kinds of organic and inorganic compounds, and applications of fluorides as a cathode material in high energy primary batteries. Electrochemical process on fluorination of compounds have some advantageous features, but is not so superior as compared with other methods of fluorination. The battery with a combined system of lithium and fluorine is theoretically ideal as a high energy one.

Electrochemical investigations in fluorine chemistry have been made in our laboratory more than for twenty years, and the following subjects from among them will be reviewed in the present paper.

### 1. Electrochemical Fluorination

- i. electrode reaction of fluorine evolution on several metals in liquid hydrogen fluoride system.
- ii. the best metal as the electrode of electrochemical fluorination
- iii. the yield of products and experimental conditions in electrolysis

### 2. Overpotential and Anode Effect

- i. effects of crystallinity of carbon materials
- ii. effects of existence of suspensive particles in bath

### 3. New Battery using Fluorides as Cathode Active Materials

batteries combined with Li and  $(CF)_n$ , and/or  $(C_2F)_n$

---

\*To be published as a full paper in J. Fluor. Chem.