

**A STUDY OF ELECTROCHEMICAL SYNTHESIS OF NITROGEN TRIFLUORIDE
ON NEW CARBON ANODE IMPREGNATED WITH MOLTEN LITHIUM FLUORIDE**

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For the industrial electrolysis of molten salt containing hydrofluoride such as $\text{KF} \cdot 2\text{HF}$, carbon has been mainly used for anode material due to no anodic dissolution.

However, in this case, there are some disadvantages as follows;

- anode effect,
- evolution of carbon tetrafluoride(CF_4)
- breakdown of anode.

Recently, for reducing these disadvantages, an improved carbon anode has been developed with impregnation of molten lithium fluoride.

In this study, the improved anode was applied to electrochemical synthesis of highly pure (little CF_4 contamination) nitrogen trifluoride(NF_3), for which only nickel anode is now available.

In several mol ratio of $\text{KF-NH}_4\text{F-HF}$ systems, anode behavior was investigated on cyclic voltammetry and on steady state method with 1 and 100 ampere scale cells. Evolved products and current efficiency of NF_3 were confirmed with 100 ampere scale cell.

Consequently, following results were observed.

- Electrolysis in a molten salt containing no KF was possible without breakdown of anode.

It was generally difficult with conventional carbon.

- Anode effect had never occurred at current density in the region of regular condition by nickel.
- Highly pure NF_3 was obtained with little CF_4 contamination.

The improved carbon is a promising anode to reject nickel for the electrochemical synthesis of NF_3 .