

THE CORROSION CHEMISTRY OF METALS IN HF-SbF<sub>5</sub>

M.F.A. Dove and M. Goodier\*

Department of Chemistry, University of Nottingham,  
Nottingham, NG7 2RD, Great Britain.

HF-SbF<sub>5</sub> mixtures are superacidic and can be used for a variety of synthetic and catalytic applications in organic chemistry. This work has investigated the ability of nickel, Inconel 600, iron, aluminium, titanium and copper to contain such media, using electrochemical techniques, surface analysis and reactions between the metals or their anhydrous fluorides and SbF<sub>5</sub>.

Differences in the behaviour of the metals are discussed. Metals such as nickel, which are routinely used to handle HF, are no longer resistant to corrosion in the presence of SbF<sub>5</sub>. Metal oxidation is accompanied by the cathodic reduction of SbF<sub>6</sub><sup>-</sup> to SbF<sub>3</sub>, as well as H<sub>2</sub> evolution. Aluminium alone does not corrode in HF-SbF<sub>5</sub>, which may be due to its inability to form M<sup>2+</sup> ions. A film of AlF<sub>3</sub> is formed which appears to be resistant to the superacid. The synthesis of Cu(SbF<sub>6</sub>)<sub>2</sub> from copper powder and SbF<sub>5</sub> in SO<sub>2</sub> is also reported.

\* Currently at Johnson Matthey Technology Centre, Blount's Court, Sonning Common, RG4 9NH, Great Britain.