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# FLUORINE CONTAINING ANSOLVO SUPER ACIDS AND INTERCALANTS IN GRAPHITE – A COMMON LINK

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Ansolvo super acids and intercalants in acceptor graphite intercalation compounds (GICs) must both be excellent electron acceptors, a property most frequently encountered in coordinatively seemingly unsaturated fluorine containing compounds. Interestingly $AsF_5$ and $SbF_5$ have served in both capacities. There is a crucial difference however: the intercalation process is a red-ox reaction with the exact nature of the intercalate unclear and often subject to controversies. The acceptor ability of ansolvo super acids is directed towards anion abstraction to generate coordinatively saturated super acid anions, capable of generating and stabilizing unusual cations either in solution or in solids.

The oxidative intercalation to generate the super acid anion $SO_3F^-$ in graphite, the physical properties and bonding will be discussed. Its reaction with $AsF_5$ and $SbF_5$ and the protic acids $HSO_3F$ and $HSO_3CF_3$ will be described. A generally applicable, interacting ion model will be proposed to describe bonding and electron transfer.

The development of $SO_3X$-based super acid systems in $HSO_3X$, with X = F or $CF_3$ will be developed and the preparation aimed at $M(SO_3X)_4$ will be discussed for a wide range of metals. Solution studies on the systems $Pt(SO_3F)_4$-$HSO_3F$, $Sn(SO_3CF_3)_4$-$HSO_3CF_3$ and $An(SO_3F)_3$-$HSO_3F$ will be described. Preparative attempts to stabilise a number of unusual cations will illustrate the effectiveness of the ansolvo super acids developed by us.