

PREPARATION OF OXIDE FLUORIDES AND OXOFLUOROMETALLATES OF TRANSITION METALS BY THERMAL DECOMPOSITION OF FLUOROPEROXO SPECIES

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Transition metal fluorides, oxide fluorides and oxofluorometallates serve as solid state materials for a wide range of applications. Further, in view of the fact that oxygen and fluorine have similar ionic radii, incorporation of fluoride ion into oxide system and *vice-versa* is possible without creating large structural changes. The existing methods used till today for the preparation of oxide fluorides and oxofluorometallates of transition elements involve hydrolysis of fluorides, use of elemental fluorine or other fluorinating agents and in some cases, the thermal decomposition of hydrated fluorides or the hydrolysed products of transition metal fluorides.

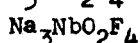
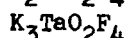
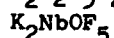
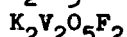
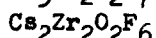
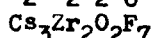
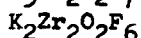
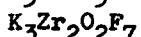
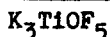
It has been observed by us that the thermal decomposition of ammonium species of solid fluoroperoxo compounds leads to the formation of oxide fluorides and those of other cations to oxofluorometallates.

The following listed oxide fluorides and oxofluorometallates have been prepared for the first time by the thermal decomposition of corresponding fluoroperoxo species. This method generates *in situ* an oxide ion in a lattice via peroxide decomposition. It is well established that on modifying the pH condition, a number of fluoroperoxo metallates can be prepared with varying amounts of fluoride and peroxide contents in them. This gives larger flexibility in terms of fluoride and oxide contents in the end products. The following solids have been characterised by STA, chemical analysis, IR, Raman and X-ray studies.

Oxide fluorides



Oxofluorometallates



These solids are stable from ambient temperature to about 900°C and some of them show phase transition (DTA). They are crystalline in nature and exhibit characteristic metal fluorine vibrations in the region 400-600 cm^{-1} . These solids may possess interesting electrical, optical and magnetic properties and find use as solid state materials.

It is noticed that thermal decomposition of fluoroperoxo species is a convenient route for the preparation of oxide fluorides and oxofluorometallates of transition elements.