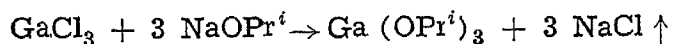


GALLIUM ALKOXIDES

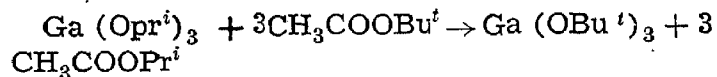
THE preparation of alkoxides of lanthanide elements by the reaction of anhydrous metal chloride and sodium isopropoxide has been recently reported from these laboratories.¹ Amongst the elements of the group, alkoxides of boron² and aluminium³ have received considerable attention, but a survey of the literature reveals that no systematic study has been done so far, for preparation of gallium alkoxides. It was, therefore, considered of interest to prepare these by reactions similar to those described for lanthanides,¹ thorium⁴ and germanium.⁵

Gallium isopropoxide has been prepared by adding stoichiometric quantity of sodium isopropoxide to a solution of gallium trichloride in anhydrous benzene and refluxing the mixture for 6-8 hours:



The isopropoxide distils at 136°/2.0 m.m. and solidifies on being kept for a few days into a crystalline solid soluble in organic solvents, but very highly susceptible to moisture. Gallium isopropoxide has been found to be a convenient starting material for the preparation of other alkoxides; thus, gallium tertiary butoxide (a colourless fuming liquid, b.p. 137°/1.0 m.m.) and methoxide (white crystalline solid insoluble in organic solvents) have been prepared by the alcohol interchange reactions between the isopropoxide and the corresponding alcohols:

$\text{Ga}(\text{OPr}^i)_3 + 3 \text{ROH} \rightarrow \text{Ga}(\text{OR})_3 + 3 \text{Pr}^i\text{OH}$
Gallium tertiary butoxide has also been prepared by the reaction of gallium isopropoxide and tertiary butyl acetate analogous to the method described for titanium and zirconium:⁶



The reaction of gallium isopropoxide with excess of acetyl chloride has been found to be highly exothermic and gives immediately a dark-red viscous liquid the analysis corresponding to $\text{GaCl}_3\text{CH}_3\text{COOPr}^i$. Similarly the reaction of anhydrous hydrogen chloride on gallium isopropoxide in benzene gave a light-red coloured liquid, $\text{GaCl}_3 \cdot \text{Pr}^i\text{OH}$. These reactions are of interest in view of the observed reactivity of alkoxides of aluminium,⁷ titanium⁸ and germanium⁹ with hydrogen halides.

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