ABSTRACTS

DEPARTMENT OF INORGANIC AND PHYSICAL CHEMISTRY

1. INVESTIGATIONS ON THE CHLORINATION OF INDIAN ILMENITE. D. P. Kharkar and C. C. Patel, *J. Sci. and Ind. Research*, 1958, **17B**, 367.

Chlorination of Travancore ilmenite has been studied under a variety of conditions on a laboratory scale. The effects of temperature, reaction period, amount and nature of carbon employed as reducing agent, grain size of ilmenite, incorporation of catalysts with the charge and promoters with the chlorine and binders for the briquettes have been investigated on the chlorination of ilmenite. It appears that the presence of manganese oxide in the mineral is responsible for the ease with which ilmenite gets chlorinated at lower temperatures. It is possible to chlorinate preferentially the iron present in ilmenite and thus upgrade the titania content by controlling the temperature (500°C) and the amount of carbon (7%) in the mixture. Of the catalysts tried, ceric oxide acts as the best carrier catalyst. The incorporation of limited amounts of oxygen, water vapour or both with the chlorine helps to enhance the rate of chlorination. The use of 30% carbon on the weight of ilmenite has been found to be optimum for the total chlorination of the mineral. Ferric chloride is found to be the best binder for the briquettes with respect to the efficiency of chlorination. Chlorination of ilmenite is efficient when 30% carbon and 1% ceric oxide are mixed with the powdered mineral (– 200 mesh) and chlorination carried out at 500°C., with chlorine containing some oxygen, the ratio of chlorine to oxygen being 15 : 1 by volume.

2. FREE ENERGY OF FORMATION OF Fe_2Cl_6 (g) AND $FeCl_2$ (g). G. V. Jere and C. C Patel, *J. Sci. and Ind. Research*, 1958, **17B**, 326.

In connection with the studies on the chlorination of ilmenite, it was found that the free energies of formation of Fe_2Cl_6 (gas) and $FeCl_2$ (gas) were not available. These values have now been calculated from the knowledge of the vaporisation data and also of the free energies of formation of $FeCl_3$(c) and $FeCl_2$(c). Two methods are used to calculate the free energy of vaporisation which when combined with the free energy of formation of the condensed compound gives the free energy of formation of the gaseous compound. The values obtained for ΔF_f^0 of Fe_2Cl_6 (g) and $FeCl_2$ (g) are respectively – 144.5 and – 36.6 Kcal/mole.

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