EXTRACTION OF TITANIA FROM ILMENITE

by

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CONTENTS

SUMMARY

This thesis is an account of an investigation of a process for separating titanium dioxide from ilmenite.

The process makes use of three chemical reactions, all conducted at high temperatures. Ilmenite is first oxidised with air, the oxidised ilmenite is then treated with chlorine, and finally the ferric chloride and oxygen produced by the action of chlorine upon oxidised ilmenite are reacted to release chlorine for further use in the process.

The application of this process to the treatment of ilmenite from beach sand deposits is the subject of this investigation.

The work reported in this thesis covers three aspects of the application of the process to the treatment of ilmenite sands and the thesis is accordingly divided into three sections.

Ilmenite from beach sand deposits is physically well suited to treatment in fluidised beds. The first section of this thesis is an account of a study of the fluidising characteristics of ilmenite sands and of their amenability to treatment at high temperatures with air and

chlorine in fluidised beds.

The second section of this thesis is a report of a study of the thermodynamics of the three chemical reactions involved in the process. Not all the data necessary for this study are available from the literature and some thermochemical quantities have been determined from measurements of equilibrium states.

The third section of this thesis is an account of preliminary studies of the rates at which ilmenite sands react at high temperatures with air and chlorine when in a fluidised state.

The progress of the investigation is then reviewed and future work is outlined.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University and, to the best of the candidate's knowledge and belief, this thesis contains no material previously published or written by another person, except when due reference is made in the text of the thesis.

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