Thermodynamics of Chlorination of Acid-Soluble Titanium Slag in Molten Salt for Preparation of TiCl4

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Abstract : Chinese titanium iron ore reserves with high calcium and magnesium accounted for more than 90% of the total reserves, and acid-soluble titanium slag which is produced by titanium iron ore always used to produce titanium dioxide through sulphate process. To broad the application range of acid-soluble titanium slag, the feasibility and thermodynamics of chlorinated reaction for preparation TiCl4 by titanium slag chlorination in molten slat were conducted in this paper. The analysis results show that TiCl4 can be obtained by chlorinate the acid-dissolved titanium slag with carbon. Component's thermodynamics reaction trend is: CaO>MnO>FeO(FeCl2)>MgO>V2O5>Fe2O3>FeO(FeCl3)>TiO2>Al2O3>SiO2 in the standard state. Industrial experimental results are consistent with the thermodynamics analysis, the content of TiCl4 is more than 98% in the production. Fe, Si, V, Al, and other impurity content can satisfy the requirements of production.

Keywords : thermodynamics, acid-soluble titanium slag, preparation of TiCl4, chlorination
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