Thermokinetics parameters for determination of risk of thermal explosion in the reaction of sulfuric acid with titanium raw materials

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Reactivity of sulphuric acid with titanium raw materials is strongly exothermic reaction in which the in addition to the heat generated could emit gases, in some cases quite extensively, which creates certain difficulties. Added to this are strongly corrosive environment and high temperature reaction. All these factors have their link with the used initial concentration of sulphuric acid to the reaction.

The paper presents results of calorimetric measurements with Norwegian and Australian ilmenites with different sulphuric acid concentration range of 82%-90%. The present results indicate a clear difference in the amount of heat generated during the reaction of the Norwegian and Australian ilmenite. The reason for the visible differences of the heat of reaction between the titanium raw materials are the significant differences in the elemental composition and phase of these materials. Results obtained were compared with the values estimated on the basis of thermodynamic calculations.