An X-ray Diffraction and Mössbauer Spectroscopy Study of the Reaction between Hematite and Aluminum Activated by Ball Milling

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The reaction between hematite and aluminum in presence of allumina as diluent activated by Ball Milling powder mixtures in different energetic conditions has been investigated. To this purpose, the powders at different milling times have been characterized by X-ray Diffraction and Mössbauer Spectroscopy. A self-substained combustion reaction was observed when the strongest energetic conditions of milling were adopted. The intermediate products of the reaction also depend on the energetic conditions: the formation of hercynite is favoured by the use of strong energetic conditions while the formation of an Fe-Al alloy was observed when a low energy per single hit is transferred to the powders.

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