

Effect of the High-Energy Ball Milling on the Combustion Synthesis of NbAl₃

Ricardo Mendes Leal Neto, Cláudio José da Rocha (IPEN)

Key words: Milling, Combustion; Intermetallics; Aluminides · For Many Years Intermetallics And Particularly Aluminides Have Been Synthesized By Exothermic Reactions. In This Work, NbAl₃ Was Synthesized By Simultaneous Combustion From Its Elemental Powders. A High-Energy Ball Milling Apparatus (Spex Mill) Was Used To Accomplish The Mixing Of The Powders Promoting A Highly Refined Dispersion. To Get This, Only The Milling Time Was Changed. For Studying The Influence Of Milling Action On Reaction Synthesis, Differential Thermal Analysis (Dta) Was Conducted On Loose Powders Of The Nb75al Milled Mixtures Up To 1100 °C At A Fixed Heating Rate Under Argon. In Order To Get Some Information About Intermediate Reactions Observed Small Samples Of The Mixtures Were Semiheated In The Dta Apparatus Up To 750 °C. X-Ray Diffraction Analysis Was Performed In As-Milled And Semireacted Samples For Phase Identification. Preliminary Results Showed That As Milling Time Is Increased, The Ignition Temperature Is Decreased To Temperatures Below The Melting Point Of Aluminum. Also A Variation In The Reaction Evolution Is Observed, Changing From Two-Stage To Single Stage Reaction.

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