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An investigation on the mechanical alloying of TiFe compound by high-energy ball milling

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This work reports the efforts to obtain TiFe intermetallic compound by high-energy ball milling of Ti and Fe powder mixtures. This process route has been used to provide a better hydrogen intake in this compound. Milling was carried out in a SPEX mill at different times. Strong adherence of material at the vial walls was seen to be the main problem at milling times higher than 1 hour. Attempts to solve this problem were accomplished by adding different process control agents, like ethanol, stearic acid, low density polyethylene, benzene and cyclohexane at variable quantities and keeping constant other milling parameters like ball to powder ration and balls size. Better results were attained with benzene and cyclohexane, but with partial formation of TiFe compound even after a heat treatment (annealing) of the milled samples.