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Dynamic compaction of iron disilicide powders VALERY LASHKOV, RFNC - VNIIEF, Sarov, Russia, ALEXANDER SELEZENEV, ANDREY STRIKANOV, ANYA TIKHONOVA, VLADIMIR RYBAKOV — Iron disilicide is attractive material for semiconductor thermoelectric cells. When made mechanochemically, the ground disilicide is very difficult to compact, which is particularly the case for nanopowders. This is a technology problem that seriously hinders the use of this material in industry. The work presented in the paper is where dynamic compaction method is used for compacting iron disilicide powder. Specific feature of this method is that the powder to be compacted is placed into a metal container, which is exposed to shock wave pressure from detonating HE. Dynamic compaction of the powder can produce strong chemical bonds at the contact between material grains, which is an advantage of this method. An experimental dynamic compaction setup has been developed that provides variation of the shock wave pressure from a few to dozens of GPa. The experiments were performed there using plane shock loading of a pre-compacted cylindrical iron disilicide sample in metal container surrounded by a thick frame of steel. The experiments used two types of loading, which were direct and reverse shocks. For the iron disilicide samples made by dynamic compaction, their density was found as a function of shock wave intensity and physical properties of material were measured such as electric and heat conductivity and thermalelectromotive force.

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