

Structure and Properties of MASHS Titanium Aluminide-based Powder Alloyed with Chromium

Tatsiana Talaka¹, Alexander Ilyuschenko¹, Andrei Letsko¹, Andrei Beliaev¹, Tatsiana Hasak¹,
Valery Olikier², Margarita Yakovleva²

¹Laboratory of New Materials and Technologies, Powder Metallurgy Institute, Belarus

²Department 49, Frantsevich Institute for Problems of Material Science, Ukraine

Abstract

Structure and properties of MASHS powder Ti-46Al-8Cr, at. %, are analyzed. Main structural constituents of the powder are titanium aluminides alloyed with chromium: γ -TiAl(Cr), α_2 -Ti₃Al(Cr) and Al_{0,67}Cr_{0,08}Ti_{0,25}. In spite of the high total intermetallic content in the synthesized powder (about 95 %), no cracks are observed in the material, even when indenting. Average powder microhardness is 313 HV_{0,25}. Multiphase dispersed strengthened structure with coherent precipitates/matrix bonding together with solid solution strengthening with chromium provide increased mechanical properties. High chromium content is expected to lead to the improved oxidation resistance of the synthesized material. Technological properties of the powder answer the requirements for detonation spraying. High-quality coatings with high hardness and low porosity (less than 1 %) have been obtained.