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Synthesis of Ti-Cu Multiphase Alloy by Spark Plasma Sintering: Mechanical and Corrosion Properties

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Краткое описание

To study the material based on the binary system Ti + Cu (50% atm), samples were produced from powders of commercially pure metals and additionally ground in a ball mill (final size about 12 μm) by spark plasma sintering. The following intermetallic phases were obtained in the materials: CuTi2, TiCu, and Ti3Cu4. The materials have a hardness of 363 and 385 HV (800 and 900 °C), a microhardness of 393 and 397 μHV, a density of 4.24 and 5.23 kg/m^3, and resistance to corrosion in acids (weight gain + 0.002% after 24 h of testing according to ISO 16151 for a sample with 900 °C—the best result in comparison with steel 308, AA2024, CuA110Fe3Mn2). The hardness value varies due to the presence of pure metal agglomerates. The relationship between the temperature of spark plasma sintering and the characteristics of the material (material parameters improve with increasing temperature, segregation is reduced) is revealed. © 2022 by the authors. Licensee MDPI, Basel, Switzerland.

Ключевые слова автора

copper; intermetallics; spark plasma sintering (SPS); titanium

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