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Production of Hard Nickel Particle Reinforced Ti6Al4V Matrix Composites by Hot Pressing

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Abstract : In the current study, titanium based composites reinforced by hard nickel alloy particles were produced. Powder metallurgical hot pressing technique was used for the fabrication of composite materials. The composites containing different ratio of hard nickel particles were sintered at 900 oC for 15 and 30 minutes under 50 MPa pressure. All titanium based composites were obtained under a vacuum atmosphere of 10-4 mbar to prevent of oxidation of titanium due to its high reactivity to oxygen. The microstructural characterization of the composite samples was carried out by optical and scanning electron microscopy. The mechanical properties of the samples were determined by means of hardness and wear tests. The results showed that when the nickel particle content increased the mechanical properties of the composites enhanced. The results are discussed in detail and optimum nickel particle content were determined.

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