

# Journal

of Achievements in Materials  
and Manufacturing Engineering



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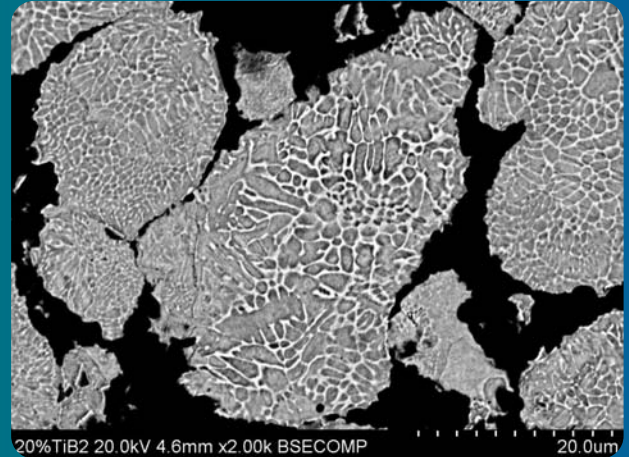


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## Selected materialographical photo



Authors: I. Sulima, L. Jaworska, P. Wyżga and M. Perek-Nowak in the paper entitled "The influence of reinforcing particles on mechanical and tribological properties and microstructure of the steel-TiB<sub>2</sub> composites" on a **page 52** discuss the effect of the reinforcing ceramic particles on the mechanical and tribological properties and microstructure of the steel-TiB<sub>2</sub> composites. The austenitic AISI316L stainless steel reinforced with 10 vol.% and 20 vol.% TiB<sub>2</sub> particles was produced using the high temperature-high pressure (HT-HP) method. The sintering process was carried out at pressure of 7.0 ± 0.2 GPa and temperature of 1200°C for 60 seconds. Density of sintered materials was measured according to the Archimedes principle. Mechanical properties were determined by Vickers hardness and compression test. The friction coefficient was measured using ball-on-disk method. This tests were realized at room temperature. Microstructural observations were carried out using scanning electron microscopy. The materials were characterized by very high level of consolidation, which equals to 96% for composites with 10 vol.% and 20 vol.% TiB<sub>2</sub> particles. The results show that the composites exhibited higher Young's modulus, Vickers hardness and compression strength when compared with conventionally austenitic AISI 316L stainless steel. The addition of 20 vol.% of TiB<sub>2</sub> particles to steel caused significant reduction of the values of friction coefficient. The SEM studies of composites allowed to reveal TiB<sub>2</sub> phase along grain boundaries. In case of the composite with 20 vol.% TiB<sub>2</sub>, the continuous layer of ceramic along the grain boundaries was observed. The obtained test results may be used to optimize the sintering process of the steel-TiB<sub>2</sub> composites by high temperature methods. These results may be used to design new materials i.e. austenitic stainless steel reinforced with TiB<sub>2</sub> ceramic.