AA 7075 Ultrafine-Grained Alloy Prepared by Mechanical Alloying and Spark Plasma Sintering

Vojtěch Kučera, Dalibor Vojtěch
Department of Metals and Corrosion Engineering, University of chemistry and technology Prague, Technická 5, 16628 Prague 6, Czech Republic. E-mail: kucerao@vscht.cz

Constantly increasing demands on mechanical properties lead to the search for new materials production technologies. The improvement could be achieved by methods of powder metallurgy, especially the ones capable to manufacture materials with ultra-fine microstructure. The aluminium alloy 7075, which belongs to the strongest commercial aluminium alloys, was prepared by mechanical alloying in combination with spark plasma sintering. The thus-prepared samples were analysed (XRD, XRF, SEM-EDS, compression stress-strain test, Vickers hardness) and compared to its commercially produced equivalent (AA 7075). Mechanical alloying led to complete dissolution of all alloying elements in the aluminium solid solution. After SPS consolidation, the very fine microstructure resulted in the increase of the compressive yield strength nearly 35 % to the commercial alloy and higher hardness.

Keywords: AA 7075, powder metallurgy, mechanical alloying, spark plasma sintering.

Acknowledgement

The authors wish to thank the Czech Science Foundation (project no. P108/12/G043) for its financial support of this research.

The authors wish to thank the financial support from specific university research (MSMT No 20-SVV/2017) for its financial support of this research.

References


