Microstructure and Mechanical Properties of Milled Carbon Fibers Reinforced EN AW 6082 Aluminium Matrix Composites after Hot Extrusion

Miroslav Glogovský[1], Martin Fujda[1], Martin Balog[2], Matej Štěpánek[2]
[1]Faculty of Materials, Metallurgy and Recycling, Technical University of Kosice, Letna 9, 042 00 Kosice, Slovak Republic. E-mail: miroslav.glogovsky@tuke.sk, martin.fujda@tuke.sk
[2]Institute of Materials and Machine Mechanics, Slovak Academy of Sciences, Dubravska cesta 9/6319, 845 13 Bratislava, Slovak Republic. E-mail: martin.balog@savba.sk, matej.stepanek@savba.sk

The microstructure and mechanical properties of carbon fibers reinforced EN AW 6082 aluminium matrix composites after hot extrusion were investigated. The distribution of carbon fibers in matrix was homogenous and their alignment was in the extruded direction. The microstructure of aluminium matrix alloy in the composites was fine grained, without defects. The heat treatment (annealing at 550 °C for 1 hour, water quenching and artificial aging at 170 °C for 8 hours) caused formation of fine solid solution grains of aluminium alloy and dissolution of Mg_2Si particles. The highest value of ultimate tensile strength was achieved in composite reinforced with 10 vol. % of carbon fibers, the worst value was achieved in composite reinforced with 20 vol. % of reinforcement. The application of heat treatment led to an increase of 0.2 yield strength and the ultimate tensile strength of composites compared to extruded states in all types of materials. These changes caused precipitation of β´´- phase particles.

Keywords: hot extrusion, carbon fibers, EN AW 6082 alloy, heat treatment

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