AN INVESTIGATION OF THE INFLUENCE OF NANO-COBALT OXIDE ON MICROSTRUCTURE AND MECHANICAL PROPERTIES OF 7075 ALUMINIUM ALLOY

TALIB ABDULAMEER JASIM, ALI HOBI HALEEM & ZAINAB ABDULELLAH HADI

Department of Metallurgical Engineering, College of Materials Engineering, Babylon University, Babill, Iraq

ABSTRACT

Aluminium Alloy AA7075 is the strongest heat-treatable aluminium series. For that they have suitable properties and tremendous applications, especially in the aviation and aerospace industries. The effect of a minor Nano-cobalt oxide on the microstructures and mechanical properties of AA7075 was investigated in this work. The investigation was carried out as a cast AA7075 with 0.2, 0.4, 0.6 and 0.8% Nano-cobalt. The optical microscopy demonstrates that the grain size of alloys was decreased with the increasing of Nano-cobalt oxide content. The Scanning electron microscopy and EDX show that the cobalt oxide present between the grains at the grain boundary. Moreover, there are Al-Zn-Mg, Al-Fe-Cu, Si-Al-Zn, Al-Fe-Cu-Co-Zn, and Al-o-Si-Zn-Cu compounds. The mechanical properties examination shows that the hardness decreased and yield stress, increased with an increasing in the Nano-cobalt content. The ultimate tensile stress and modulus elasticity also increased with the increase of Nano-cobalt content, except alloy with 0.8% Nano-cobalt which decreased to 5.87 GPA.

KEYWORDS: Aluminium Alloy (7075), Nano-Cobalt Oxide, Micro Structural; Mechanical Properties & Aerospace Aluminium Alloys

Received: Jul 30, 2018; Accepted: Aug 20, 2018; Published: Sep 15, 2018; Paper Id.: IJMPERDOCT201843