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Effect of Pre-Aging and Aging Parameters on Mechanical Behavior of Be-Treated 7075 Aluminum Alloys: Experimental Correlation using Minitab Software

Authors : M. Tash, S. Alkahtani

Abstract : The present study was undertaken to investigate the effect of pre-aging and aging parameters (time and temperature) on the mechanical properties of Al-Mg-Zn (7075) alloys. Ultimate tensile strength, 0.5% offset yield strength and % elongation measurements were carried out on specimens prepared from cast and heat treated 7075 alloys. Duplex aging treatments were carried out for the as solution treated (SHT) specimens (pre-aged at different time and temperature followed by high temperature aging). A statistical design of experiments (DOE) approach using fractional factorial design was applied to determine the influence of controlling variables of pre-aging and aging treatment parameters and any interactions between them on the mechanical properties of 7075 alloys. A mathematical models are developed to relate the alloy ultimate tensile strength, yield strength and % elongation with the different pre-aging and aging parameters i.e. Pre-aging Temperature (PA T0C), Pre-aging time (PA t h), Aging temperature (AT0C), Aging time (At h), to acquire an understanding of the effects of these variables and their interactions on the mechanical properties of be-treated 7075 alloys.

Keywords : aging heat Treatment, tensile properties, be-treated cast Al-Mg-Zn (7075) alloys, experimental correlation
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