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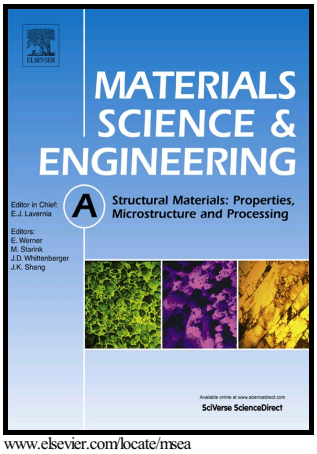

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Improving the fatigue strength of 7075 alloy through aging

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Abstract

In order to optimize the fatigue strength of 7075 Al alloy, the hardness, tensile and fatigue tests as well as the microstructure observation under different aging conditions were investigated. The result indicates that, with the aging time increasing, the precipitation spacing first decreases and then increases, which leads to the hardness and tensile strength first increasing and then decreasing. With the increase of yield strength, the fatigue strength increases first and then decreases, resulting in an optimization of fatigue strength. Especially, the specimen aged at 120 °C for 48 h with strength and elongation in middle of the three specimens exhibits the highest fatigue strength of 165 MPa. Considering the effect of yield strength on fatigue strength and fatigue damage, the causes for the parabolic variation of fatigue strength were analyzed.

Keywords: 7075 Al alloy, Aging treatment, Hardness, Tensile strength, Fatigue strength