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The effects of aging treatments on mechanical property and corrosion behavior of spray formed 7055 aluminium alloy

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Abstract

The relationship among microstructures, mechanical properties and corrosion behaviors of spray formed 7055 aluminium alloy has been investigated upon peak-aging (T6), double-aging (DA) and retrogression and re-aging (RRA). The research is estimated by hardness test, tensile test, immersion test, detailed microstructure observation and potentiodynamic polarization under different aging treatments. Results demonstrate that the corrosion resistance rank of aging treatments is as follow: DA＞RRA＞T6. The continuous grains boundary precipitations (GBPs) and coarse Al_7Cu_2Fe particles increase the corrosion susceptibility. The appearance of the pit cavity attributes to coarse grains and the considerable potential difference between the matrix and GBPs or precipitate-free zones (PFZs) during intergranular corrosion (IGC) process. The wedging stress from hydrogen cracks and the accumulation of the corrosion products help induce the exfoliation corrosion (EXCO). Anodic dissolution and hydrogen embrittlement cause stress corrosion cracking (SCC) of the alloy under different aging treatments. The