Effect of Solution Temperature on Corrosion Behavior of 7050 Alloy after Heat Treatment in 3.5% NaCl Solution

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The corrosion behavior of solution-treated 7050 alloys at different temperatures was investigated by microstructure observation, electrochemical test and immersion test in 3.5% NaCl solution. The result shows that AlCuFe, MgZn₂ and Al₂CuMg gradually precipitate in the treated 7050 alloys with the increasing solution temperature. It is also found that the alloys exhibit different corroded characteristics when different solution temperatures are carried out. The corrosion process represents an obvious feature of galvanic corrosion due to the different corrosion potentials of AlCuFe, Al₂CuMg, MgZn₂ and α -Al phases. Al₂CuMg and MgZn₂ phases serve as anodes and the undissolved AlCuFe as cathode, which causes the tremendous decline of corrosion resistance. The corrosion rate of solution-treated 7050 alloys is increased with the increase of solution temperature. Finally, the alloy treated at 525°C is only influenced by AlCuFe cathode, and has the best corrosion resistance and the weakest corrosion tendency in this work.

Keywords: 7050 alloy; Solution treatment; Microstructure; Corrosion behavior

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