

ABSTRACT

Several studies have reported that retrogression and reaging (RRA) heat-treatment process leads to improved resistance to stress-corrosion cracking in aluminium alloys having high strength. However, its effect on intergranular corrosion susceptibility is not yet studied in detail. The consequences of the RRA process on intergranular corrosion susceptibility of high strength 7075 alloys is investigated in the current study. The RRA treatment is performed on Al 7075 at 180°, 240° and 320° C for 10, 30 and 50 minutes followed by reaging similar to T6 treatment (120° C for 26 hours). The mechanical properties of RRA treated alloys varies as per the changes in retrogression temperature or time. An inverse relationship between micro-hardness and electrical conductivity is established during the research. The intergranular corrosion susceptibility test is carried out as per ASTM G110-92 standards. The precipitation behaviour during the heat-treatment process is analyzed using optical and scanning electron microscopy. The retrogression and reaged alloys show improvement in the intergranular corrosion resistance with low temperature and less time retrogression showing better susceptibility. The change in corrosion and other physical properties are related to the interparticle distance between the precipitates and its growth at the grain boundary.

Keyword: Retrogression and Reaging, Aluminium Alloy 7075, Intergranular Corrosion, Precipitation Behaviour