

Corrosion Characterization of Al6061 Hybrid Metal Matrix Composites in Acid Medium

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Abstract : This paper deals with the high corrosion resistance developed by the hybrid metal matrix composites when compared with that of matrix alloy. Matrix selected is Al6061. Reinforcements selected are graphite and red mud particulates. The composites are prepared using liquid melt metallurgy technique using vortex method. Metal matrix composites containing 2 percent graphite and 2 percent red mud, 2 percent graphite and 4 percent red mud, 2 percent graphite and 6 percent of red mud are prepared. Bar castings are cut into cylindrical discs of 20mm diameter and 20mm thickness. Corrosion tests were conducted at room temperature (230 °C) using conventional weight loss method according to ASTM G69-80. The corrosents used for the test were hydrochloric acid solution of different concentrations. Specimens were tested for every 24 hours interval up to 96 hours. Four specimens for each condition and time were immersed in corrodent. In each case the corrosion rate decreases with increase in exposure time for matrix and metal matrix composites whatever may be the concentration of hydrochloric acid. This may be due to aluminium, which may induce passivation due to development of non-porous layer. As red mud content increases the composites become corrosion resistant due to insulating nature of ceramic material red mud and less exposure of matrix alloy in those metal matrix composites.

Keywords : Al6061, graphite, passivation, red mud, vortex

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