

The effect of aging time on microstructure and hardness value of AZ80 Mg Alloy

Abstract

AZ 80 Magnesium (Mg) alloy (AZ80) is the lightest structural metallic materials with good mechanical properties. However, Mg AZ80 has drawbacks which result in poor ductility and low strength where applications of Mg alloy have been restricted. The AZ80 has high aluminium content can cause the precipitation of β -phase which is $Mg_{17}Al_{12}$ in Mg-Al alloy. It can affect the mechanical properties such as poor strengthening. This paper was discussed the effect of aging time on microstructure and hardness value of AZ80. The AZ80 samples were cut to $1\text{cm} \times 1\text{cm}$. Samples heat treated at 360 C for one-hour quenching in water. Then, samples aged at 170 C with different aging times (2 to 8 hours) with same quench. Optical Microscope (OM), Scanning Electron Microscopy (SEM), X-ray Diffraction (XRD) and Vickers Microhardness machine were used to analyse the samples. As the results showed β - $Mg_{17}Al_{12}$ phase was discontinuously distributed along the grain boundary throughout solid solution treatment. The β - $Mg_{17}Al_{12}$ phase did not fully dissolve into the α -Mg phase and distributed along the grain boundary. The results showed that sample after 2 hours aging time with highest hardness value 62.5 HV is the optimum sample.