Phase Analysis of EN AW 6023 Aluminum Alloy after Short Time Aging

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The phase analysis of the EN AW 6023 aluminum alloy after the heat treatment by short time aging was investigated. The good machinability of this heat treatable and lead free Al-Mg-Si wrought alloy is achieved by alloying of tin and bismuth. In experimental procedure, the solution annealing at 550 °C for 1 hour and subsequent water quenching of the analyzed alloy was realized. The short time artificial aging at 190 °C for 1 hour was carried out immediately after quenching. The microstructure analyses, the EDS analyses and the phase analyses using the hard X-ray diffraction by synchrotron radiation in DESY Hamburg were realized. Significant changes of the alloy phase composition were not observed after short time artificial aging applied on quenched and/or naturally aged alloy. Above all, the minority β''(Mg_5Si_6) phase was identified as a strengthening phase in alloy α(Al) solid solution as the majority alloy phase. In addition, the minority of Sn, Mg_2Sn, Bi_2Mg_3, $AlCu_2Mn$, $Al_{15}(Mn,Fe)_3Si_2$ phases were identified in alloy microstructure.

Keywords: Aluminum Alloy, Phase Analysis, Microstructure, Natural Aging, Artificial Aging

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