Use of Microscopy in the Study of Self-Hardening Al-Alloy for Automotive Application

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Self-hardening secondary Al-Zn-Si-Mg alloys represent an innovative class of light Al-Si alloys. The most important and relevant feature of the self-hardening alloys is related to their good performance, without the need of any heat treatment. Mechanical properties depend upon the morphologies, type and distribution of the phases. It is therefore important to study the intermetallic phases occurring in the secondary Al-alloys, where they found more than in the primary-Al alloys. Study of intermetallic phases in the alloy was performed on an optical microscope using classical etching technique (by 0.5 % HF) to invocation black-white contrast as well as unconventional methods for invocation colour contrast (etching by Weck-Al) to the observed surface of the sample. The colour metallography results were correlated with the information obtained by standard etching. The microstructures of the samples were analysed by scanning electron microscopy after standard etching and deep etching (with HCl) too. After deep etching we are able to see the 3D morphology of eutectic Si particles and intermetallic phases.

Keywords: aluminium cast alloy, microstructure, intermetallic phases, morphology.

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