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# Experimental investigation on the formation of Cr-containing dispersoids in an AlSi3 alloy by X-ray synchrotron radiation

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## Abstract

The nucleation and growth of Cr-containing dispersoids during solution treatment were studied for an AlSi3 alloy. The local structure around Cr atoms was investigated by means of X-ray Absorption Spectroscopy (XAS) for the first time. The results are presented as both X-ray Absorption Near Edge Structure (XANES) spectra and Extended X-ray Absorption Fine Structure (EXAFS) functions. Ex-situ and in-situ analyses were performed in order to gain a complete overview of the mechanism. In-situ analyses were carried out at various intermediate temperatures up to the solution treatment temperature of 545°C. These measurements, combined with in-situ Photo Emission Electron Microscopy (PEEM) and X-ray Photoelectron Spectroscopy (XPS) analysis, allowed the authors to distinguish dispersoids from intermetallic secondary phases and, therefore, properly study only the formation and the chemistry of these precipitates.

It was found that the nucleation of dispersoids starts between 400 and 500 °C. This nucleation temperature range is higher than what usually found for Mn-containing dispersoids. It is a useful piece of information for controlling these precipitates and, consequently, their influence on mechanical properties.

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