

## Inter-Filling of CaO and MgO Mixed Layer in Surface Behavior of Al-Mg Alloys Containing Al<sub>2</sub>Ca

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**Abstract :** Oxide layer of normal Al-Mg alloy can be characterized by upper MgO and lower MgAl<sub>2</sub>O<sub>4</sub> spinel. The formation of the MgO outmost layer occurs by the surface segregation of Mg in the initial oxidation. After then, the oxidation is proceeded with the formation of MgAl<sub>2</sub>O<sub>4</sub> spinel beneath the MgO. Growth of the oxide layer is accelerated by constant formation of MgAl<sub>2</sub>O<sub>4</sub> spinel. On the other hand, the oxidation resistance of Al-Mg alloys can be significantly improved simply by Mg+Al<sub>2</sub>Ca master alloy use as the Mg alloying element and such an improvement is attributed to the CaO/MgO mixed layer. Al-Mg alloy containing Al<sub>2</sub>Ca shows CaO as the upper layer and MgO as the lower one without MgAl<sub>2</sub>O<sub>4</sub> spinel. Such a dense oxide film acts as a protective layer. However, the CaO/MgO scale has the outmost MgO, partly, after a long time exposure to a harsh oxidation condition. The aim of this study is to investigate the inter-filling behaviour of CaO and MgO mixed layer in oxidation resistance mechanism of Al-Mg alloys containing Al<sub>2</sub>Ca. The process of outmost MgO layer formation will be clarified.

**Keywords :** Al-Mg alloy, Al<sub>2</sub>Ca, oxidation, MgO

**Conference Title :** ICMMP 2016 : International Conference on Microstructure and Materials Properties

**Conference Location :** Vancouver, Canada

**Conference Dates :** August 04-05, 2016