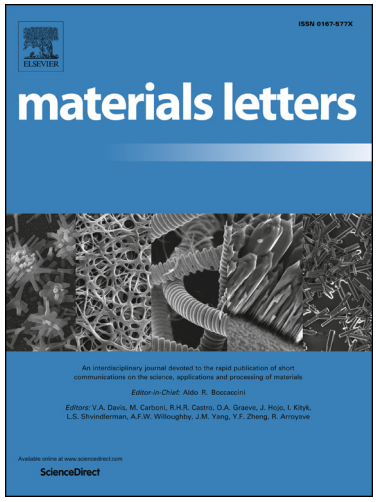

Foam stabilization by magnesium

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Foam stabilization by magnesium

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Abstract

Foaming behavior of Al-Mg alloy melts with and without a thickening step was studied. Stable foams were obtained in both the cases. Oxides formed in Al-Mg melts were studied using XRD, SEM and TEM. These studies revealed the formation of $MgAl_2O_4$, MgO and transition oxides in Al-Mg melts. The stabilization of Al-Mg foams was attributed to the formation of $MgAl_2O_4$ and transition oxides.

Keywords: Oxidation, Porous materials, stabilization, casting, magnesium, metals and alloys.

Introduction

Among the various routes of producing aluminum foams, melt route is the most advantageous due to a lower cost of raw materials involved and the possibility of production of a large volume. In this process, foam stability is due to the presence of ceramic particles in melt which increase melt's viscosity, which in turn suppresses the drainage of melt through films and plateau borders. Such ceramic particles are either externally-added or produced in-situ [1]. Externally-added particles are mostly used in large quantities and therefore make foams brittle. Because of this, the energy absorption properties of foam are reduced [2]. In contrast, in-situ particles are required in a smaller quantity and therefore does not cause brittleness [3].