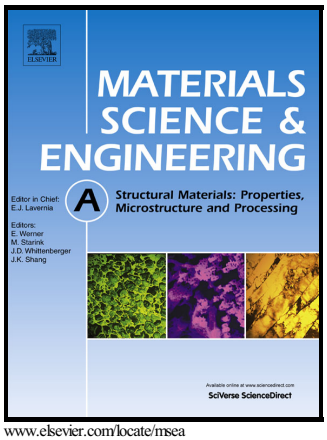

www.elsevier.com/locate/msea

High strength Al with uniformly distributed Al_2O_3 fragments fabricated by accumulative roll bonding and plasma electrolytic oxidation

M. Reihanian, M. Jalili Shahmansouri, M. Khorasanian

PII: S0921-5093(15)30047-2
DOI: http://dx.doi.org/10.1016/j.msea.2015.05.104
Reference: MSA32432

To appear in: *Materials Science & Engineering A*

Received date: 2 March 2015
Revised date: 24 April 2015
Accepted date: 29 May 2015

Cite this article as: M. Reihanian, M. Jalili Shahmansouri and M. Khorasanian, High strength Al with uniformly distributed Al_2O_3 fragments fabricated by accumulative roll bonding and plasma electrolytic oxidation, *Materials Science & Engineering A,* http://dx.doi.org/10.1016/j.msea.2015.05.104

High strength Al with uniformly distributed Al_2O_3 fragments fabricated by accumulative roll bonding and plasma electrolytic oxidation

M. Reihanian*, M. Jalili Shahmansouri, M. Khorasanian

Department of Materials Science and Engineering, Faculty of Engineering, Shahid Chamran University of Ahvaz, Iran

Abstract

Accumulative roll bonding (ARB) and plasma electrolytic oxidation (PEO) were used to fabricate Al/Al_2O_3 composite. A uniform distribution of Al_2O_3 fragments was achieved within the Al matrix after six ARB cycles. In contrast to the large fragments, a small fragment contains no porosity and exhibits good bonding at interfaces. The Al/Al_2O_3 composite exhibited improved tensile strength of about 180 MPa, in comparison to the annealed Al (47 MPa).

Keywords

Composites; Sheet forming; Electron microscopy; Mechanical characterization

1. Introduction

During the last decades, metal matrix composites (MMCs) have been interested in the aerospace, automotive and recreation industries because of their unique balance between the physical and mechanical properties [1]. Compared with the conventional metal alloys, MMCs exhibit superior properties such as increased specific strength and stiffness, wear resistance, vibration damping and decreased coefficient of thermal expansion [2]. Casting and powder

* Corresponding author. Tel.: +98 61 33330010 19x5684; fax: +98 61 33336642.
E-mail address: reihanian@scu.ac.ir (M. Reihanian)