

Accepted Manuscript

Effect of laser ablation surface treatment on performance of adhesive-bonded aluminum alloys

Yongrong Wu, Jianping Lin, Blair E. Carlson, Peng Lu, Michael P. Balogh, Nicholas P. Irish, Yu Mei

PII: S0257-8972(16)30311-5
DOI: doi: [10.1016/j.surfcoat.2016.04.051](https://doi.org/10.1016/j.surfcoat.2016.04.051)
Reference: SCT 21126

To appear in: *Surface & Coatings Technology*

Received date: 11 December 2015
Revised date: 21 April 2016
Accepted date: 23 April 2016



Please cite this article as: Yongrong Wu, Jianping Lin, Blair E. Carlson, Peng Lu, Michael P. Balogh, Nicholas P. Irish, Yu Mei, Effect of laser ablation surface treatment on performance of adhesive-bonded aluminum alloys, *Surface & Coatings Technology* (2016), doi: [10.1016/j.surfcoat.2016.04.051](https://doi.org/10.1016/j.surfcoat.2016.04.051)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Effect of laser ablation surface treatment on performance of adhesive-bonded aluminum alloys

Yongrong Wu¹, Jianping Lin^{1*}, Blair E. Carlson², Peng Lu², Michael P. Balogh², Nicholas P. Irish², Yu Mei¹

¹ School of Mechanical Engineering, Tongji University, 4800, Cao'an Highway, Shanghai, 201804, China.

² Global Research & Development Center, General Motors Corporation, Warren, MI, 48090-9055, USA.

*Corresponding author. Tel.: +86 139 0171 9457; Fax: +86 021 69589485

Full postal address: No. 4800, Cao'an Highway, School of Mechanical Engineering, Tongji University, Shanghai, 201804, China

E-mail address: jplin58@tongji.edu.cn (Jianping Lin)

Abstract

This study was conducted to investigate the effect of laser ablation surface treatment on the joint performance of AA6022-T4 2.0mm adhesively bonded to itself. It was found that laser ablation treatment at higher energy fluence (i.e., 19.01 J/cm²) improved the joint strength by 25% versus untreated material as measured after water soak exposure. Furthermore, a greater proportion of fracture surface exhibited pure cohesive failure following laser ablation treatment. Results revealed that while laser ablation treatment at lower energy fluence had little influence on the surface topography (though it did act to remove any sheet metal lubricant or other contaminants), treatment at higher energy fluence increased both surface roughness and surface area. This is considered a contributing factor to the improved adhesive bond performance. However, the higher energy fluence were also found to modify the surface chemistry and created a more uniform and thicker aluminum oxide layer, which was likely to be another contributing factor to the improved bond performance. Additionally, the effect of

Download English Version:

<https://daneshyari.com/en/article/8024991>

Download Persian Version:

<https://daneshyari.com/article/8024991>

[Daneshyari.com](https://daneshyari.com)