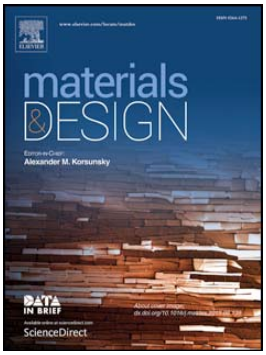

A new laser joining technology for direct-bonding of metals and plastics

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PII: S0264-1275(16)31080-2
DOI: doi: 10.1016/j.matdes.2016.08.018
Reference: JMADE 2171

To appear in:

Received date: 20 June 2016
Revised date: 21 July 2016
Accepted date: 4 August 2016

Please cite this article as: ¡.!.–[.I.N.S.].[.Y.J.].–¿.Y.J.¡.!.–[./.I.N.S.].–¿. Chen, ¡.!.–[.I.N.S.].[.T.M.].–¿.T.M.¡.!.–[./.I.N.S.].–¿. Yue, ¡.!.–[.I.N.S.].[.Z.N.].–¿.Z.N.¡.!.–[./.I.N.S.].–¿. Guo, A new laser joining technology for direct-bonding of metals and plastics, (2016), doi: 10.1016/j.matdes.2016.08.018

A new laser joining technology for direct-bonding of metals and plastics

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Abstract

A direct laser joining technique for bonding plastics to metals, namely laser-assisted metal and plastic (LAMP) joining was developed about eight years ago. Notwithstanding the successes that have been obtained for LAMP, the inherent features of laser-induced bubbles in the joint remains a major concern. In this research, a new laser joining technology with the aid of ultrasonic vibration has been developed to bond plastics to metals with improved joint strength. Experiments have been conducted to join polyethylene terephthalate and titanium using this new technology; preliminary results have been encouraging. With the aid of ultrasonic vibration, joint strength can be improved by as much as four times greater than that produced by the conventional LAMP process. This improvement is largely caused by the formation of a thicker chemically bonded metal-plastic interface, which was supported by the results of an XPS analysis conducted across the joint interface.

Keywords: Laser joining; Ultrasonic vibration; Titanium; Polyethylene terephthalate; Joint interface; Failure load

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