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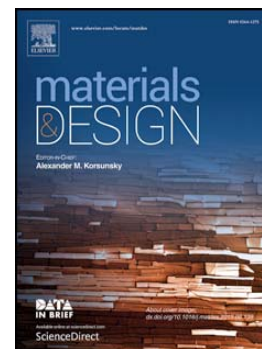
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**Microstructure and mechanical properties of laser welded-brazed Mg/Ti joints
with AZ91 Mg based filler**

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Abstract

AZ31B Magnesium (Mg) alloys and Ti-6Al-4V titanium (Ti) alloys were joined by laser welding-brazing process with AZ91Mg based filler. Uniform and continuous weld surfaces without obvious defects were produced in a relatively large processing window. In the process Al element diffused from the filler and reacted with Ti resulting in metallurgical bonding of Mg/Ti joint. An ultra-thin reaction layer with serrate-shaped morphology was evidently observed at the interface of AZ91 fusion zone/Ti. The thickness was varied slowly with the change of the heat input. Newly formed interfacial compound was then identified as Ti_3Al phase by transmission electron microscopy (TEM) analysis. The maximum tensile-shear strength reached 2057 N, representing 50% joint efficiency relative to Mg base metal. Two kinds of fracture modes were noticed during the tensile-shear test. Observation of fracture surfaces suggested some reaction products were attached to Ti substrate in both cases, which was found to prevent crack propagation effectively and thus improved the joint strength.

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