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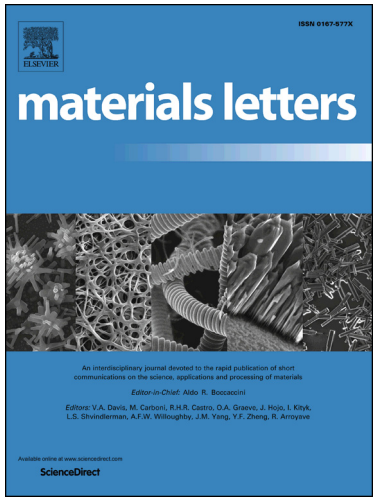

C-O bond enhancing direct bonding strength between plastic and pure titanium

Katsuyoshi Kondoh, Junko Umeda

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C-O bond enhancing direct bonding strength between plastic and pure titanium

Katsuyoshi Kondoh [a,*], Junko Umeda [a]

[a] Joining and Welding Research institute, Osaka University, 11-1 Mihogaoka, Ibaragi, Osaka 567-0047, Japan

*Corresponding author; kondoh@jwri.osaka-u.ac.jp

ABSTRACT

Direct bonding process by using the conventional hot pressing was applied to prepare the dissimilar materials consisting of the thermoplastic resin and pure titanium (Ti) material. In employing the pressing temperature at the melting point of plastics, the interfacial bonding shear strength of the dissimilar material using polyamide66 (PA66) was drastically increased. Microstructure and phase analysis clarified that C=O double bonds of the carbonyl group was thermally decomposed and oxygen atoms contributed to diffusion into pure Ti or oxides formation at the interface. In addition, the chemical reaction of C-H and N-Ti formation was also effective to the interfacial bonding improvement. On the other hand, when polystyrene (PS) with no functional group including C-O/C=O bond was employed, for example, the PS-Ti dissimilar material showed no bonding strength even then the bonding temperature was close to 300℃.

Keywords

bonding: interface: dissimilar material: C=O bond: titanium