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# Effect of Laser Input Energy on the Laser Joining of Polyethylene Terephthalate to Titanium

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**Abstract :** This paper reports the effects of laser energy on the characteristics of bubbles generated in the weld zone and the formation of new chemical bonds at the Polyethylene Terephthalate (PET)/Ti joint interface in laser joining of PET to Ti. The samples were produced by using different laser energies ranging from 1.5 J – 6 J in steps of 1.5 J, while all other joining parameters remained unchanged. The types of chemical bonding at the joint interface were analysed by the x-ray photoelectron spectroscopy (XPS) depth-profiling method. The results show that the characteristics of the bubbles and the thickness of the chemically bonded interface, which contains the laser generated bonds of Ti–C and Ti–O, increase markedly with increasing laser energy input. The tensile failure load of the joint depends on the combined effect of the amount and distribution of the bubbles formed and the chemical bonding intensity of the joint interface.

**Keywords :** laser direct joining, Ti/PET interface, laser energy, XPS depth profiling, chemical bond, tensile failure load
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