

Accepted Manuscript

Efficient Microwave Welding of Polypropylene Using Graphite Coating as Primers

Xuefei Sun, Guangming Wu, Jianxiang Yu, Chunnuan Du

PII: S0167-577X(18)30410-5
DOI: <https://doi.org/10.1016/j.matlet.2018.03.046>
Reference: MLBLUE 24007

To appear in: *Materials Letters*

Received Date: 28 December 2017
Revised Date: 5 March 2018
Accepted Date: 7 March 2018

Please cite this article as: X. Sun, G. Wu, J. Yu, C. Du, Efficient Microwave Welding of Polypropylene Using Graphite Coating as Primers, *Materials Letters* (2018), doi: <https://doi.org/10.1016/j.matlet.2018.03.046>

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.



Efficient Microwave Welding of Polypropylene Using Graphite Coating as Primers

Xuefei Sun^a, Guangming Wu^a, Jianxiang Yu^{a,*}, Chunnuan Du^a

^aDepartment of Materials Science and Engineering, Beijing Institute of Petrochemical Technology, Beijing 102617, China

ABSTRACT: Graphite coating was created on PP interface for an efficient microwave welding process. The graphite powder(GP) can significantly absorb microwave energy and transform into a large amount of heat upon the electromagnetic absorbent, leading to a sharp increase in temperature that can rapidly melt the interface of PP substrates and form a new structure where the GP was covered. The welding area of PP/GC samples obtained by microwave irradiation exhibited uniform surface appearance and high electric conductivity. Meanwhile, the PP/GC/PP samples showed high interfacial strengths, which were influenced by the duration of microwave welding, the size and content of GP in solder. And the bonding stress under optimal condition was about 2.17MPa, which demonstrated great potential in plastic bonding and material processing.

Keywords: Welding; Graphite powder; Interfaces; Welding strength; Conductive polymer

1. Introduction

Microwave is a kind of short wavelength electromagnetic wave, with the range of 30cm-1mm in air [1]. Microwave has been widely employed in material processing and information transmission for several decades' development. In addition, the study of microwave joining of ceramic materials has been relatively matured since 1980s and widely reported to achieve the effective welding in several parts [2-4]. Carbon materials can largely absorb microwave energy and partially convert to heat with a sharp increase of temperature [5,6]. In terms of microwave energy loss mechanism,

Download English Version:

<https://daneshyari.com/en/article/8013788>

Download Persian Version:

<https://daneshyari.com/article/8013788>

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