

# Accepted Manuscript

Multi-scale analysis of the effect of loading conditions on monotonic and fatigue behavior of a glass fiber reinforced polyphenylene sulfide (PPS) composite

P. Zuo, R.C. Benevides, M.A. Laribi, J. Fitoussi, M. Shirinbayan, F. Bakir, A. Tcharkhtchi



PII: S1359-8368(17)33739-3

DOI: [10.1016/j.compositesb.2018.03.031](https://doi.org/10.1016/j.compositesb.2018.03.031)

Reference: JCOMB 5590

To appear in: *Composites Part B*

Received Date: 31 October 2017

Revised Date: 26 February 2018

Accepted Date: 16 March 2018

Please cite this article as: Zuo P, Benevides RC, Laribi MA, Fitoussi J, Shirinbayan M, Bakir F, Tcharkhtchi A, Multi-scale analysis of the effect of loading conditions on monotonic and fatigue behavior of a glass fiber reinforced polyphenylene sulfide (PPS) composite, *Composites Part B* (2018), doi: 10.1016/j.compositesb.2018.03.031.

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.

# Multi-scale analysis of the effect of loading conditions on monotonic and fatigue behavior of a glass fiber reinforced polyphenylene sulfide (PPS) composite

P. Zuo<sup>1\*</sup>, R.C. Benevides<sup>2</sup>, M.A. Laribi<sup>1,4</sup>, J. Fitoussi<sup>1</sup>, M. Shirinbayan<sup>1</sup>, F. Bakir<sup>3</sup>, A. Tcharkhtchi<sup>1</sup>

<sup>1</sup> Arts et Métiers ParisTech, PIMM – UMR CNRS 8006, 151 Boulevard de l'Hôpital, 75013 Paris, France

<sup>2</sup> Valeo thermique habitacle, Valeo powertrain thermal systems, 8 Rue Louis Lormand, 78321 La varrière, France

<sup>3</sup> Arts et Métiers ParisTech, Dynfluid – UMR CNRS 8006, 151 Boulevard de l'Hôpital, 75013 Paris, France

<sup>4</sup> Ecole Nationale d'Ingénieurs de Sousse, LMS, Pôle technologique, Route de Ceinture, 4054 Sousse, Tunisia

E-mails: rodrigo.benevides@valeo.com, mohamed-amine.laribi@ensam.eu, joseph.fitoussi@ensam.eu, mohammadali.shirinbayan@ensam.eu, farid.bakir@paris.ensam.fr, abbas.tcharkhtchi@ensam.eu

---

## ABSTRACT

In this paper, two kinds of PPS/GF composite samples (PPS-0°, PPS-90°) were prepared with two different fiber main orientations related to the injection direction. A wide range of their properties were discussed. Using DMTA analysis, it was shown that the PPS/GF composite under study obeyed the time-temperature equivalence principle. Moreover, Perez model was verified and gave a good estimation of the viscoelastic properties of the PPS/GF. Monotonic and fatigue behaviors and fatigue life of PPS/GF were investigated. Fiber's orientation, applied amplitude and loading frequency effects were emphasized. Self-heating effect on fatigue strength was also analyzed. SEM fracture surface observations allowed analyzing, at the local scale, the main deformation mechanisms occurring during mechanical loading. No evident damage development was observed for both monotonic and fatigue loading. PPS matrix plasticity appeared to be the predominant deformation mechanism until a semi-ductile or semi-brittle final failure depending on the loading conditions and local microstructure.

**Keywords:** Poly-Phenylene Sulfide (PPS), composite, glass fiber, fatigue behavior, self-heating.

---

## 1. Introduction

\*Corresponding author, peiyuan.zuo@ensam.eu, Tel: +33-144246105

Download English Version:

<https://daneshyari.com/en/article/7212024>

Download Persian Version:

<https://daneshyari.com/article/7212024>

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