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The contribution of infrared thermography in the characterization of jute based composites

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Abstract

The growing environmental awareness is driving attention towards the development of ever more ecological and friendly materials, calling for the use of natural matrix and fibres in composite materials. The attention of this work is focused on two types of composites, which both include jute as reinforcement but different matrices. One matrix is polypropylene (PP) and the other one is polylactic acid (PLA), so to have partial, or total, natural materials. Several specimens are prepared and tested under impact, or cyclic and quasi-static bending. An infrared imaging device is used to in-line monitoring of specimens under each test. The visualization of thermal effects coupled with mechanical stresses allows getting complimentary information, which may be exploited to better understand the reaction of materials to applied forces and their damaging modes.

Keywords: thermoplastic composites, PP/jute, PLA/jute, infrared thermography, in-line thermal monitoring, cyclic bending tests, quasi-static bending tests, impact tests.

1. Introduction

The discovery of plastic in the mid-1800's has been welcomed as a great event projected to revolutionize the human life. Indeed, a lightweight, strong, and relatively inexpensive material suddenly appeared to be convenient in replacing heavy metals. Yet, this event has now turned into a serious pollution problem since plastic materials, which are used in the production of so many

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