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PURPOSE OF THE ABSTRACT

Institut de Chimie des Milieux et Matériaux de Poitiers (IC2MP CNRS UMR 7285 -University of Poitiers) is an interdisciplinary chemistry institute working in (1) the design of clean processes and (2) the transfer and bioaccumulation of organic molecules in eco-systems. Within IC2MP, the E4 team (catalysis and unconventional medias) has an important scientific background in the field of catalysis applied to the conversion of renewable carbon, air depollution, electrosynthesis, hydrotreatment and fluoration. Scientific strategy of this group is organized around three main aspects that are (1) catalytic conversion of renewable carbon in non conventional medias (non-thermal plasma, ionic liquids, eutectics, HF..), (2) preparation of catalytic materials (oxides, carbonaceous materials, hybrid organic-inorganic materials, nanostructured catalysts) and (3) mechanismsc investigation (modelisation, dynamic characterization, model/kinetic reactions). In all investigated catalytic processes, the economical and ecological footprints of the whole catalytic processes are considered. In this context, the selectivity of reactions, the choice of the solvents, the separation of the reaction products, the catalyst stability and recycling and the energy consumption of studied catalytic processes are particularly investigated.

The PPRIME Institute is one of the CNRS laboratory, located at Poitiers (CNRS UPR 3346 www.pprime.fr). It develops research in the field of mechanical and aeronautical engineering. Among the different fields covered, the Department of Physics and Mechanics of Materials gathers competencies for the study of physical and mechanical properties of materials at different scales. In particular, we have been working for about 10 years on eco-composite behaviour, made of plant fibres (flax, hemp, wood) and polymer matrix (epoxy, greenpoxy, PA11?). Within IC2MP team, non-thermal plasma processes are used to promote chemical reactivity by support pretreatment/activation prior to chemical reactions or direct chemical reaction in the plasma discharge [1]. One of the current projects consists in functionalizing hemp fibers by non-thermal treatment in order to improve their adhesion properties with epoxy resins for composite material development. Composite materials are widely used in transport industries due to their mechanical properties and light weight. However, they are mainly made of glass fibers that are environmentally unfriendly due to their energy consumption for production and non-recyclability. Composites with natural fibers constitute an interesting alternative to glass fibers composites and their functionalization by non-thermal plasma an interesting alternative to current chemical or thermal pre-treatments that can alter the mechanical properties of the fibers. With this process, chemical functions can be grafted on the fibers surfaces while preserving the integrity of their structure. In collaboration with 2 researchers from PPRIME Institute (co-authors), adhesion between the hemp yarn and the epoxy matrix will be investigated by micromechanical testing. Fragmentation tests will be performed using single yarn composite specimens [2]. The Interfacial Shear Strength (IFSS) and interfacial debonding length values will be compared between samples made with untreated hemp yarn or plasma treated hemp yarn. First results are already very promising (Fig. 1).

FIGURES

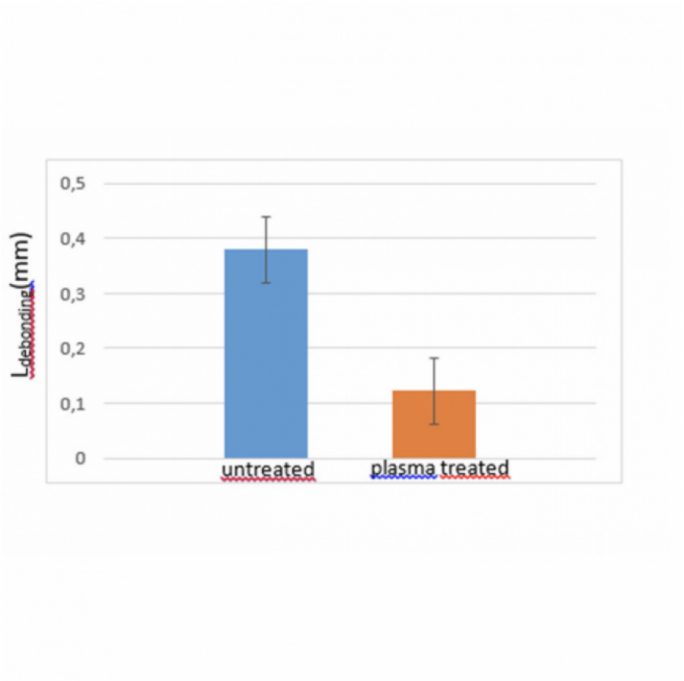

FIGURE 1

FIGURE 1.
interfacial debonding length
First results concerning interfacial debonding length values measured on single hemp yarn/epoxy composites after fragmentation tests with untreated or plasma treated hemp yarn

FIGURE 2

KEYWORDS

BIBLIOGRAPHY