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Nano-hydroxyapatite and phosphate glass fibre reinforced poly-lactic acid based hybrid composites for biomedical applications

ZHENG Y[1], FU G[2], HALL P[1] and **SHARMIN N[1]**
[1]University of Nottingham Ningbo China, China
[2]Zhejiang University, Hangzhou, China

Due to the high mechanical properties, outstanding processing performance and biodegradable properties, ploylactic acid (PLA) attracted numerous studies in the past decades. Many reports indicated that PLA has high potential for high value added applications. Hydroxyapatite, $Ca_{10}(PO_4)_6(OH)_2$, has shown the osteoblast functions and bone bonding ability. It is an excellent material for biofunction scaffolds, drug delivery system and other biomedical applications. The major drawback of HA is the poor mechanical properties which inhibit its use. The initial aim of this present work was to study the mechanical performance of the nano-sized HA filled PLA composites. Different percentage of nano-HA was incorporated with PLA. The mechanical, thermal, morphological and thermodynamic properties of the nan0-compostes were investigated. The functional groups of n-HA and PLA were confirmed by Fourier transforms infrared spectroscopy. The morphological picture indicates due to the poor interfacial adhesion, many micro-cracks formed with the increase of HA content. However, due to the higher hardness and toughness of nano-sized HA, the tensile and flexural properties of the 5% HA incorporated PLA composites attained significant improvement. The final aim of this study is to reinforce this 5% nano-HA containing composite with phosphate glass fibres and study the mechanical and biological properties of this composite for potential biomedical application.

Biography

She works in the University of Nottingham Ningbo China in the department of Chemical and environmental engineering. Her field of expertise is fibre reinforced composites for biomedical, marine and aerospace applications. Her current research is focused on the use of phosphate glass fibres to reinforce bioresorbable polymers for bone fracture fixation applications. Dr. Sharmin completed her PhD in Materials Engineering and Materials Design from The University of Nottingham UK. Dr Sharmin has published more than 15 papers on biomaterials and more than 30 papers on different fields of materials science.

nusrat.sharmin@nottingham.edu.cn

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