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Porous PEEK-IF WS₂ nanocomposite with improved mechanical properties for biomedical applications

Poly ether ether ketone (PEEK) has gained wide spread acceptance as clinical load-bearing orthopaedic implants. Accordingly, making porous polymer structure is of great interest to increase the specific surface area for cell attachment and tissue ingrowth. In this research, inorganic fullerene like WS₂ (IF-WS₂) nanoparticles have been incorporated into porous PEEK matrix to improve the wear resistant properties. IF-WS₂ nanoparticles have been synthesized by rotary chemical vapour deposition (RCVD) method using WO₃ with H₂S gas and Ar atmosphere, and a very thin multi-layered carbon on their surface was used to improve the interface bonding with the PEEK matrix. Various amount of C-coated IF-WS₂ nanoparticles were added into PEEK using a wet mixing method. Commercial NaCl particles were used as a space keeper to generate highly porous structures in the composites. After leaching out the NaCl using water, the composite porous blocks were resulted. We will report the detailed morphological, structural characterizations and mechanical properties of the resulting porous composites, benchmarked against pure porous PEEK samples, to assess their potentials towards biomedical applications.

Biography

Bahareh Yazdani has completed her PhD from University of Exeter in 2015 within three years with seven published papers. She is doing her Postdoctoral studies at University of Exeter in Novel High Performance Polymeric Composites for Additive Manufacturing. She has published more than 20 papers in reputed journals including her Master degree, four years of her research work and PhD thesis. She is an expert Material Scientist with specifications in Nanomaterials and Nanocomposite Processing and Characterizations.

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