

Research project and supervisor team

Supervisory Team	Dr AKM Asif Iqbal
Short introduction & description of research project	Biomaterial-based artificial bone implants are becoming popular for treating human bone problems. Developing artificial bone implants for bone repair is a significant topic in advanced bio-manufacturing. Traditional metallic biomaterials are permanent and non-degradable in physiological environments. These materials used in bone-fixing implants require re-surgery to retract following tissue healing. In addition, metallic materials have a higher elastic modulus and strength than real bone. This elastic modulus mismatch causes stress shielding, which limits bone development and remodeling to meet mineral content requirements. Eventually, the surrounding bone becomes weak and porous, causing implant failure. One prospective solution to the above problem is to develop a suitable material that shows similar mechanical properties to human bone, accelerates the healing process, and can be completely resorbed in the human body after the healing of the fractured bone. Therefore, in this research, a novel hybrid composite has been proposed that can possess all the properties necessary for the bone implant. The Magnesium (Mg) based composite will be fabricated with hydroxyapatite (HA) and graphene (GNP) reinforcement using 3D printing. Their mechanical corrosion and degradation properties will be evaluated by experimental investigation and numerical analysis.
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