Recyclable and Eco-friendly Single Polymer Composite

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1 Introduction

Composites based on metal, ceramic and polymer matrices have ubiquitous applications in aerospace, automotive, electrical appliances, microelectronics, infrastructure and construction, medical and chemical industries [1–3]. Interest has shifted towards synthetic and biopolymers and polymer composites as replacements to conventional composite materials as they are far more economical and easier to process [3, 4]. To meet the requirements for, The polymeric material properties can be modified and tuned for specific applications using fillers and fibers [1, 2] for more well-defined physicochemical properties, enhanced mechanical strength and stiffness, with low specific gravity but high thermal and chemical resistance [5–7]. The two main constituents of a polymeric composite are the polymer matrix which is the continuous phase, and the reinforcing material which is the discontinuous or dispersed phase. The properties are governed by the properties of the matrix and the reinforcing material such as the aspect ratio, chemical nature, purity, distribution, orientation and geometry; and the amount and the interfacial adhesion between the matrix and the reinforcement material [4].

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