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Hybrid polymer composites epoxy/PVB reinforced with single-wall/double-wall carbon nanotubes

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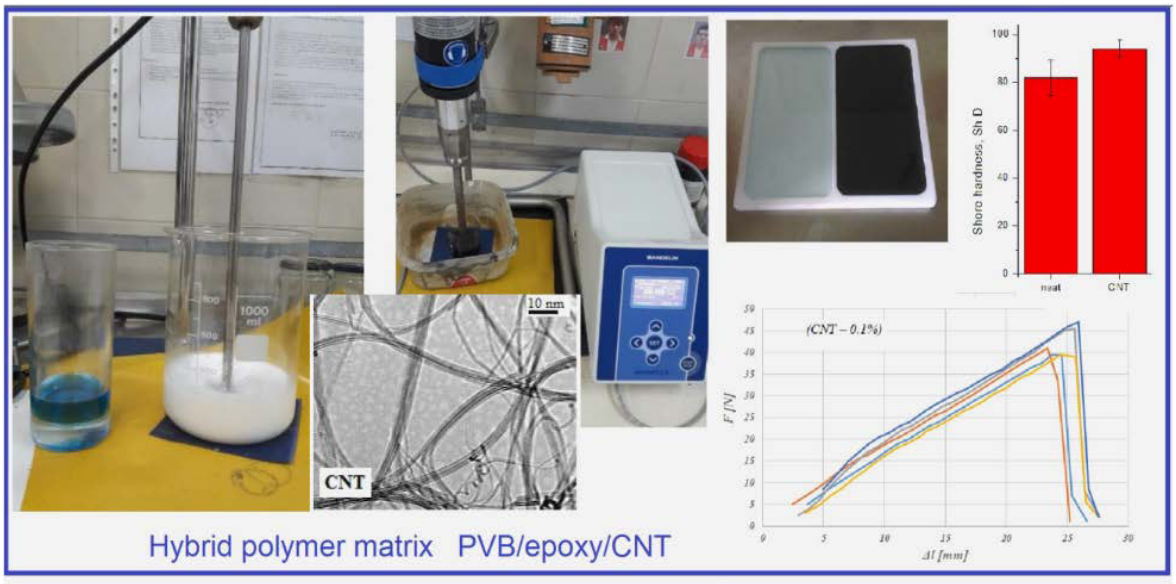

Abstract

Extensive research is carried out in the field of composite materials, which are increasingly replacing conventional materials. This research considers the application of carbon nanotubes (CNTs) as reinforcement of a hybrid polymer matrix, consisting of epoxy resin and polyvinyl butyral, PVB. This combination was chosen to achieve good adhesion to many materials, for future application in structural, laminated and sandwich composites, for many industries. CNTs consist of cylindrically bent single-layer sheets of carbon atoms (graphene), having excellent electrical properties, thermal and mechanical resistance. The preparation of the composite matrix consists of ultrasonic dispersion of CNTs in ethanol, dissolution of PVB in this dispersion, and homogenization with an epoxy system. Tensile strength and hardness were determined and compared to the neat, non-reinforced hybrid matrix.

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Material description: Carbon nanotube composite materials represent a very attractive alternative to conventional composite materials due to their incredible mechanical, electrical, thermal and chemical properties. These materials are characterized by very high tensile strength, low density, and excellent thermal conductivity. In addition, they are characterized by increased wear resistance. Such composite materials are widely used in sports equipment for bicycle frames, tennis rackets, hockey sticks, skis, kayaks, as well as in the textile industry for antistatic and electrically conductive textiles, bulletproof vests and in the automotive and space industries.

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