

Epoxy composites based on 3-D structured CNTs/CNFs

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Carbon nanotubes(CNTs) and carbon nanofibers(CNFs) have drawn much attention due to the potential for the various applications as reinforcement because of their excellent mechanical properties. Despite CNTs/CNFs have superior mechanical properties, previous researches has not shown expected excellent results when using CNTs/CNFs as reinforcing additives in composites. One of the main reasons for lower mechanical properties than expected value of CNTs/CNFs is that CNTs are easily pulled out from the matrix in the fracture situation. In order to overcome this problem, we have proposed 3-D nano structures. Our strategy begins with preparation of polymer nanofibers contain Fe catalyst by electrospinning. Then, the prepared polymeric nanofibers are converted into CNFs by carbonizing process. Chemical vapor deposition method was used to grow CNTs onto the surface of CNFs, resulting in 3-D carbon nano structure. The diameters and length of CNTs and CNFs could be easily controlled by adjusting the process parameters. Finally, mechanical properties of our 3D nanostructures would be measured to confirm their increased mechanical properties for the application of reinforcement.