

Mechanical Properties of CNT Reinforced Composite Using Berkovich Nanoindentation Analysis

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Abstract : Spherical and Berkovich indentation tests are carried out numerically using finite element method for uniformly dispersed Carbon Nanotube (CNT) in the polymer matrix in which perfectly bonded CNT/matrix interface is considered. The Large strain elasto-plastic analysis is performed to investigate the actual scenario of nanoindentation test. This study investigates how the addition of CNT in polymer matrix influences the mechanical properties like hardness, elastic modulus of the nanocomposite. Since the wall thickness to radius ratio (t/r) is significantly small for SWCNT there is a huge possibility of lateral buckling which is a function of the location of indentation tip as well as the mechanical properties of matrix. Separate finite element models are constructed to compare the result with Berkovich indentation. This study also investigates the buckling behavior of different nanotube in a different polymer matrix.

Keywords : carbon nanotube, elasto-plastic, finite element model, nano-indentation

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