The effects of MWNT content and aspect ratio on the properties of epoxy-based nanocomposites are investigated using nanoindentation and nanoscratch methods. The Halpin-Tsai model for predicting the elastic modulus and hardness is modified to include the effective aspect ratio factor. The modified model predicts the experimental results more accurately. The frictional behavior is investigated and a new equation is proposed that correlates the ploughing friction with the plasticity index. The dispersion state of MWNTs and the surface features of residual grooves are investigated using scanning electron micrographs and AFM profiles. The mechanisms of improvements in the properties are also discussed.

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