

Tension properties of graphene nanotube hybrid structures

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Graphene has been reported with record-breaking properties which have opened up huge potential applications in the area of electronics, photonics, sensors, bio-applications, and others. A considerable research has been devoted to manipulate or modify the properties of graphene to target a more smart nanoscale device. Graphene and nanotube hybrid structure (GNHS) is one of the promising graphene derivatives. It is noticed that previous studies have emphasized on the thermal or electrical properties of GNHS, leaving its mechanical properties being rarely discussed. Therefore, a systematic investigation of the tension properties of GNHS will be conducted in this paper basing on the large-scale molecular dynamics simulation. The target GNHS will be constructed by considering two separate graphene layers that being connected by single-wall or multi-wall nanotube(s) according to the experimental observations. The C-C atomic interactions will be described by the AIREBO potential. This study will enrich the current understanding of the mechanical performance of GNHS, which will eventually shed lights on its applications in nanoelectromechanical systems.

Keywords: graphene, nanotube, tension, molecular dynamics simulation