AXIAL STIFFNESS OF MULTIWALLED CARBON NANOTUBES AS A FUNCTION OF THE NUMBER OF WALLS

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S u m m a r y

The axial stiffness of multiwalled carbon nanotubes (MWCNTs) is studied as a function of the number of walls and their parameters. It is demonstrated that the axial stiffness is determined only by several external shells (usually 3–5 and up to 15 for the extremely large nanotubes and high elongations) which is in good agreement with the experimentally observed inverse relation between the radius and the Young modulus (i.e., stiffness) of MWCNTs. Such behavior is a consequence of the van der Waals intershell interaction. An interpolating formula for the MWCNT's actual axial stiffness as a function of the external radius and the elongation of a tube is obtained.