ELASTIC PROPERTIES OF GRAPHENE-GRAPHANE NANORIBBONS

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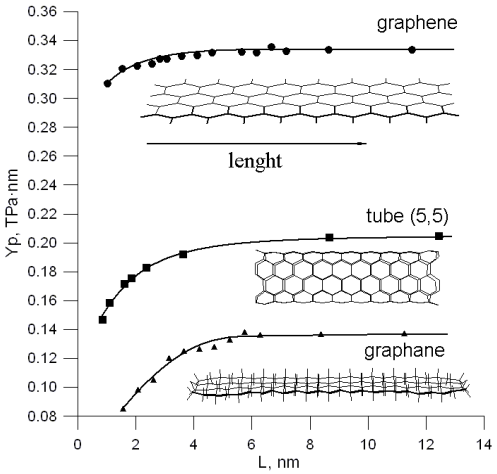

We report the results of the theoretical study of the atomic structure and elastic properties of graphene-graphane nanoribbons of limited length. We apply the tight binding approach [1] and molecular simulations [2] to calculate the structural characteristics and elastic constants of graphene-graphane nanoribbons of different width and length. Elastic moduli depend on the length and width of the nanoribbons. Elastic moduli of graphene-graphane nanoribbons have been compared to the moduli of the carbon nanotubes. Figure presents the dependences of the pseudo-Young's module Yp of some nanoribbons and the nanotube on the length L. These values increase with increasing length. Elastic module Yp and Poisson's ratio of graphene-nanoribbon are more than those of the nanotube and graphane- nanoribbon. Good agreement with experimental results has been obtained for the calculated Young's moduli of nanotubes and graphene.

References

[1] O. E. Glukhova and O. A. Terent'ev *Theoretical Study of the Dependences of the Young's and Torsion Moduli of Thin Single-Layer Carbon Zigzag and Armchair Nanotubes on the Geometric Parameters*. Physics of the Solid State, **48**, 1411-1417 (2006)

[2] D.W. Brenner *Empirical potential for hydrocarbons for use in simulating the chemical vapor deposition of diamond films.* Physical Review B, **42**, 9458-9471 (1990)