Contribution ID: **72** Type: **Poster**

Features of adsorption, mechanical properties of nano composites of multiwalled carbon nanotubes and polyethylene, polyvinyl chloride, porous polystyrene

Saturday, 26 September 2020 15:42 (4 minutes)

The concentration dependence of the elastic module E(C) in polyvinyl chloride (C2H3Cl)n + multiwalled carbon nanotubes (MWCNT) can be described by a percolation model with the extremely low percolation "threshold" in the range 0.02 ÷ 0.1%.
The Poisson coefficient μ is equal to ratio of relative transversal compression ε⊠ to relative longitudinal lengthening ε⊠ and equal [1]:
μ = ε⊠/ε⊠ = 1/2[1 + 1/1-(V⊠/V⊠)2], (1)
Debye temperature θD was determined after the formula [1]:
θD = h/kB(9NAρ/4πA)1/3 . (1/V⊠3 + 2/V⊠3)1/3, (2)
where kB - Bol'cman constant, h - Plank constant, NA - Avogadro number, A - middle gram-molecular mass, ρ - density, V⊠ - longitudinal ultrasonic (US) velocity, V⊠ - transversal US velocity.
The account of dispersion of elastic mechanical vibrations energy of SiO2+Si plate on the structure defects results in expression for frequency of free vibrations of disk [1]:
ω = [(Dβ2/ρhR4 - 2π2(Q-1/T)2]1/2, (3)
where cylindrical inflexibility of plate D = Eh3/12(1 - μ)2 determined through the elastic module
E = 12ρω2R4(1 - μ)2/β2h2, (4)
plate thickness h and Poisson coefficient μ, β – is a dimensionless coefficient the value of which depends on the number of key circumferences, ρ – the specific density of plate, R - the disk radius, Q-1 – internal friction (IF), T – the disk vibrations period.
REFERENCES
[1] A.P. Onanko, D.V. Charnyi, Y.A. Onanko, M.P. Kulish etc. Conference Proceedings of 18 Geoinformatics: theoretical and applied aspects, 2019, 1-5 (2019). DOI: https://doi.org/10.3997/2214-4609.201902110.

Topics

Session A. Physics of condensed matter and spectroscopy

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Session Classification: Poster session