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# Specificities of anelastic characteristics of nano composites multiwalled carbon nanotubes and polyvinyl chloride, polyethylene, foam polystyrene

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The influencing of ultrasonic (US) deformation εUS was researched on anelastic and elastic characteristics of nano composites of multiwalled carbon nanotubes (MWCNT).
It's showed, that anelastic internal friction (IF) Q-1 and elastic modulus E characteristics are essentially depended from morphology of surface layer [1]. The complex elastic modulus of polyvinyl chloride (C2H3Cl)n, polyethylene (C2H4)n, expanded polystyrene C8H8 nano composite E*is equal to the sum of dynamical elastic modulus E' = ρV2⊠ and loss modulus E" = E'δ:*
*E* = E' + E" = E' (1 + δ) = ρV2⊠ (1 + δ) = ρV2⊠ (1 + πQ-1) = ρV2⊠ (1 + αV/f), (1)
where δ – ultrasound (US) attenuation logarithmic decrement, ρ - specimen density; V⊠ - quasitransversal US elastic waves velocity, Q-1 – internal friction.
E"/E' = δ = πQ-1 = αλ = αV/f, (2)
where α – US attenuation coefficient, λ – the US wave length, f – US frequency. The US attenuation logarithmic decrement δ vibrations with amplitude A = A0e-δx is equal to:
δ = ln(An+1/An) (3)
The increase of the nano composite crystalline degree at growth of multiwalled carbon nanotubes concentration filling with the nanotubes of matrix results in the decline of content of well-organized phase.
As the result of the mechanical study the presence of the strong effect between low-density polyethylene (C2H4)n, polyvinyl chloride (C2H3Cl)n and multiwalled carbon nanotubes was confirmed.
REFERENCES
[1] A.P. Onanko, D.V. Charnyi, Y.A. Onanko, M.P. Kulish etc. Conference Proceedings of 19 Geoinformatics: Theoretical and Applied Aspects, 2020, 1-5, (2020). DOI: https://doi.org/10.3997/2214-4609.2020geo040.

## Topics

Session A. Physics of condensed matter and spectroscopy

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