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Peculiarity of mechanical characteristics of nano composites of multiwalled carbon nanotubes and polyethylene, polyvinyl chloride, porous polystyrene

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The quasitransversal ultrasonic velocity V⊠ = 756± 10 m/sec, shear module G = ρV⊠12 = 554 MPa, Poisson coefficient μ ≈ 0,44, Debye temperature θD ≈ 71 K polyethylene with low density high pressure (C2H4)n were determined from the oscilloscopegramma. The ultrasonic (US) attenuation logarithmic decrement was δ_⊠≈1,65×⊠10⊠^(-1).
If dislocation segment ξ(x,y), that are vibrated under the act of tension τ, is charged, additional forces will operate on it FE = eρ(ξ)E and FM = eρ(ξ)[∂ξ/∂t, B], where ρ(ξ) - is the distribution function of electrical charge density on the dislocation segment [1]. The system of equations, which describes the movement of the charged dislocation under act of the mechanical, electrical and magnetic fields, acquires the following kind:

M∂2ξ/∂t2 = Vd ∂2ξ/∂x2 - Q∂ξ/∂t + bτ − bτa - Nj ∂U/∂ξ + eρ(ξ)E + eρ(ξ)[∂ξ/∂t, B], (1)

∂2τ/∂y2 − ρ/G ∂2τ/∂t2 = ρb∂2/∂t2<∫0∞[∫01ξ(x)dx]N(l)dl>. (2)

Acoustic emission (AE) method was measured the group longitudinal wave velocity in SiO2+TiO2+ZrO2 film there was v⊠ = l/t ≈ 0,00042 m/0,114 mcsec ≈ 3680 m/sec and the group shear wave velocity was v⊠ = l/t ≈ 0,00042 m/0,134 mcsec ≈ 3130 m/sec. Taking into account the value of density ρ ≈ 4,05.103 kg/m3, elastic modulus was determined E = ρ.v⊠2 ≈ 54,85 GPa and shear modulus was determined G = ρ.v⊠2 ≈ 39,68 GPa.
REFERENCES
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Topics

Session A. Physics of condensed matter and spectroscopy

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