

Nanocomposites and nanomaterials

Photoacoustic effect in nanodiamond-based nanofluids

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Nanodiamonds are a new class of nanoparticles in the carbon family with unique physical and chemical properties [1]. The main advantages of this nanomaterial are fully biocompatibility, low toxicity, easy penetration through cells, photoluminescence features. Therefore nanodiamonds are attractive for their applications in biomedical imaging, tissue engineering, drug delivery systems, theranostics [2].

Our report is devoted to the photoacoustic characterization of nanodiamond-based nanofluids in piezoelectric configuration. In particular, we studied colloidal solutions with different concentration of nanoparticles. Amplitude-frequency and phase-frequency dependencies of the photoacoustic responses from colloidal solutions were experimentally measured. As a result dependencies of signal amplitude on concentration were obtained. The nonlinear character with well-pronounced maximum of the dependencies was observed. For the explanation of this behavior thermal conductivity of the colloidal solutions was measured. The significant increasing of the thermal conductivity of nanofluids with nanoparticles concentration was stated.

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