ELECTRODYNAMIC RESPONSE OF SMALL PARTICLES IN ELECTROMAGNETIC RADIATION

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The effect of electromagnetic radiation (EMR) to interact with small particles (MCH) bullet form and disperse systems (DS) based on them at the interface. Generalized application of the theory of Maxwell-Garnett (MG) and the effective medium approximation for DS with appropriate inclusion. Conditions of excitation and propagation of surface electromagnetic modes (TEM) in DC under the influence of EMR and Interphase Boundary section on optical absorption and scattering.

The paper presents the results of studies of two-layer MCh response to the action of the electromagnetic field in terms of their possible practical use. Get complete information about practically comment particles to give effect EMR frequency dependence of the dielectric constant. It is shown that such particles in the frequency extremes alezhnostyah permeability associated with collective electronic excitations at the interface.

The purpose of research - development of theoretical methods of calculation processes of absorption of electromagnetic radiation dispersed systems based on dual-layer spherical particles with regard to their surface excitations.

Materials and methods research. The study of the processes of interaction of small particles dispersed in different systems under EMR reduces to use the dielectric approach. The essence of the latter is to apply the dielectric function $\varepsilon\ \omega\ =\ n+ik^{\ 2}$ which describes the properties of small particles and disperse

systems based on them and at the same time determines their response to electromagnetic radiation given form, structure and texture.

If the problem statement was considered a case structure particles kernel MCH and the environment - conventional dielectric and semiconductor material shell.

In the adopted model problem of determining the effective permittivity DS came to finding such polarization MCH. This problem, in turn, is associated with solving the problem of potential theory.

The difference between the extremes is more pronounced at higher dielectric permittivity shell. Thus, an artificial change in thickness of the shell, it is possible to control the placement of a resonant frequency and relative magnitude of extremes. Thus, the interaction modes can be set to a resonant frequency by changing the optical properties of the structure as a whole, which is essential in the design of optoelectronic devices. The results will be useful in the design of optoelectronic devices to optimize their resonant properties.

Conclusions

An expression for calculating the polarizability bilayer of small particles (dielectric core - shell semiconductor) in an electric field that varies harmonically with time. The obtained frequency dependence of the effective dielectric function of disperse systems with inclusions indicate the existence of management capabilities not only the provisions of resonant frequencies in a wide frequency range, and - most largest extremes.

On the basis of present calculations can be argued that the presence of an external electric field changes the electromagnetic properties: the redistribution of charges peaks shift position and changes in the intensity of electromagnetic radiation absorption system of small particles. The nature of change processes of absorption depends on the electrodynamic parameters (effective dielectric permittivity own fashion fluctuations, physical and chemical state, etc.).