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EM wave scattering by one and many small impedance particles of arbitrary shape and applications

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Many-body Electromagnetic (EM) wave scattering problems are solved asymptotically, as the size of particles tends to zero and the number of these particles tends to infinity. Electromagnetic wave scattering by many small impedance particles of an arbitrary shape is studied. This theory allows one to give a recipe for creating materials with a desired refraction coefficient. One can create material with negative refraction, that is, the group velocity in this material is directed opposite to the phase velocity. One can create a material with a desired permeability. The theory presented in this talk is developed in the monograph. Numerical results are available in the papers. Papers deal with wave scattering by many small particles. Monograph deals with inverse problems. In particular, the problem of finding the location of small subsurface inhomogeneities from the scattering data measured on the surface is studied. In monograph analytical formulas for the polarization tensor for bodies of arbitrary shapes are derived.

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Thermodynamic and structural behavior of Tl-Pb liquid alloy

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Thermodynamic properties such as free energy of mixing, heat of mixing, entropy of mixing, activities and the microscopic structural properties, such as concentration fluctuation in long-wavelength limit, chemical short-range parameter and ratio of mutual and intrinsic coefficients of Tl-Pb liquid alloy at 773 K have been studied on the basis of regular associated solution model. We have estimated the mole fractions of the complex and the unassociated atoms assuming the existence of Tl_3Pb complex as energetically favoured in the liquid state. The compositional contributions of the heat of mixing of the species Tl and Pb and the heat of formation of the compound to the net enthalpy change have also been studied. Both the theoretical and the experimental values of the concentration fluctuation in long-wavelength limit are found to be less than the ideal value revealing that the concerned system is hetero-coordinating in nature. The interaction energies are found to be temperature dependent and Tl-Pb liquid alloy at 773 K is found to be weakly interacting system.

Biography

Devendra Adhikari is a Professor of Physics in Tribhuvan University, Nepal. He completed his PhD from T.M. Bhagalpur University, India. He has published more than five dozens of researcher articles in the journal of international repute. He is chief editor of a peer review journal and serving as a member of editorial board of different international journals. He has visited different universities and institutes as a guest scientist.

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