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Semiclassical models in ceramics and nanoobjects

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General formulation of thermodynamics of metastable states and relaxation is proposed and discussed. Semiclassical Models are used also as a tool for solving problems in Materials Science. Wide range of processes and materials are considered. Among them crystals, containing micro and macro defects, like point defects, vacancies, dislocations, pores and cracks. Influence of these defects on properties of materials, including strength and fracture ones, are discussed. Polar materials, containing pores and inclusions of different phases are investigated. Cavitation phenomenon in polar materials in external fields is predicted. Semiclassical theory of the basic properties of nanoobjects is formulated. Friction of collective electrons in nanoobjects is taken into account. Comparison of experimental data with theoretical ones shows rather a good agreement. These data can be useful for Master Degree and PhD students, studying Materials Science.

Biography

Yuri Kornyushin graduated from Taras Shevchenko State University in Kiev, Ukraine, in 1965, was awarded PhD degree in 1967, and Dr Sci degree in 1984. During his career he worked on Physical Bases of Materials Science. From 1965 to 1990 he worked in The Institute for Metal Physics of NAS of Ukraine in Kiev, and from 1991 to 2001 in the Hebrew University in Jerusalem.

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