

Peculiarities of the Electronic Structure and Dynamics in the Nanosystems

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From the experimental results with Electron Spin Resonance in combination with other methods, numerous special complexes of odd electrons in many different materials and biomedical nanosystems and the concerning unique effects have been revealed. The behaviour of these complexes shows some unusual characteristics very distinct from the ones in the normal crystalline systems. It is especially notable that these new effects stand in close connection with the fundamental properties of the materials such as the conformation, the conductivity, the biomedical activity.

Over a long period of time we have carefully persued these phenomena and come to the conclusion that they only can be adequately explained through a new consideration on the ground of the Structure and Dynamics of the Quasi-Free Electrons in the Short-Range Order of the nanosystems. On the basis of this elaborated model there is the possibility of a profound interpreting the molecular electronic mechanisms of the particular features and technological factors of the materials and biomedical nanosystems.

As illustration examples, the effect of strong crystal field, the effect of sudden change of the conductivity, the effect of radiation emission in some materials and biomedical systems, the molecular electronic mechanism of the toxicity of Dioxin, the superconducting nanomechanism in YBCO compounds, and other phenomena are briefly exposed and discussed.

Keywords: structure and dynamics in nanosystems, electron dynamics in nanostructures, electron dynamics in nanosystems