**Theoretical prerequisites for the use of preparations based on metallic nanoparticles**

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The nutrition of the biological injection of nanomaterials, their toxicity and the ability to positively contribute to the metabolic processes and the physiological state of the organism as a whole, is becoming the key to the fundamental interactions of nanoparticles with the biological medium.

Because the basic properties of nanomaterials are formed at the stage of their formation, the issues of biological efficiency are closely related to the kinetics of processes occurring in the reaction zone. There are prerequisites for obtaining materials with a sharply unbalanced structure, which means with an increased level of free energy and, therefore, increased ability to interact with the environment. The size of nanoparticles significantly affects the expected result of their application, but this is not the only important parameter of their state. The presence of other factors, such as structural-phase composition, particle shape, surface charge, preparative form of nanomaterial, acidity of the environment, processes that characterize the functionality of a particular system, directly affect the efficiency of nanomaterials.

Phase and chemical composition of nanoparticles, crystal lattice parameters and dimensions of coherent scattering regions in the state of production are given in table.

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| --- | --- | --- | --- | --- |
| **Characteristics of Fe-containing phases in iron nanoparticles** | **Type of crystalline phase** | | | |
| **α–Fe** | **γ–Fe** | **FeO** | **Fe3O4** |
| **Max value of the phase content, %** | **15,4** | **54,5** | **7,2** | **77,4** |
| **а, nм** | **0,2864** | **0,3624** | **0,4301** | **0,8372** |
| **DCSR, nм** | **53** | **24** | **3,2** | **1** |