

## Answers

Suggested research has two potential ways of development:

- a) The use of nanomaterials to release internal energy using electromagnetic interactions (to create heat generators, engines etc.)
- b) The use of nanomaterials to release internal energy during mechanical interactions (to break down rocks, obstacles etc.)

1. What kind of nanocomposites are possible for such energy generation? Are they metal matrix, polymer or ceramic based composites?

❖ During our alternative energy research project were used the following components:

- Nanostructures based on  $\text{SiO}_2$  - opal matrices of 100...200 nanometres, free spaces of which were filled with ferromagnetic composites (see figure).

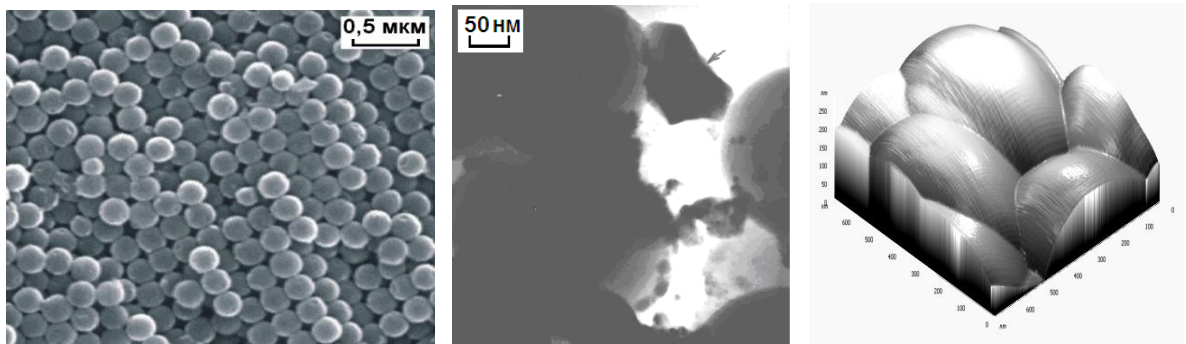


Figure - Opal matrices microphotograph (orderly packed  $\text{SiO}_2$ ) and volumetric fragment after Ni incorporation.

- Carbon ceramic porous matrix with metallic inclusions
- Metallic nano lattice based on  $\text{Al}_2\text{O}_3$  with pores of 50 nanometers

❖ For the release of energy during mechanical interactions (b) were used various nanometals, for instance, W, Ti, Ta, Fe, Al, Mg, as well as oxides and carbides of W, Ti, Ta in different proportions, transitional metals with light isotopes were tested as well.

One of the aims of our cooperative work is the determination of the most suitable nanocomposites.

2. What is the basic science behind choosing the composition of composite materials for such energy generation.

The scientific principal behind this research is new antenna model of the atom. Antenna model of the atom gives new understanding of Bohr postulates, shows mechanisms of atom's emission and its spectral characteristics.

Based on the analyses of this model, necessary conditions, which lead to interruption of the electrodynamic stability of the atom, were determined. Therefore, atom destabilisation leads to the release of internal energy.

This has a very important practical application due to the fact that it opens new approaches to the release of internal energy with the use of nanotechnologies.

- release of energy during remodelling of atom's electron energy levels without waste of energy on ionisation and heat;
- release of abnormal internal energy during penetration of hard nanoparticles into the obstacles.

3. The words “3d nanostructured nanocomposites” and “electromagnetic fields of steep gradient” are not clearly understood.

3D nanostructured nanocomposites - volumetric isotropic medium, which has nanomaterial properties in all 3 dimensions.

Electromagnetic fields of steep gradient – the change in intensity of electromagnetic field is comparable with the sizes of structural elements of the medium.

4. Similarly, the terms “electromagnetic interaction” and “mechanical interaction” are not understood.

Electromagnetic interaction – the action on the substance by electromagnetic field.

Mechanical interaction – the action on the nanomaterial of the obstacle with impact duration time of  $10^{-6} \dots 10^{-7}$  sec.

Are the radiation and mechanical force applied separately based on the kind of composite? or they are applied at the same time?

In the physical process (a) only electromagnetic interactions are considered, process (b) uses both mechanical and electromagnetic interactions together.

5. Finally, how can the energy be applied to new engines for vehicles and so on?

The possibility of applying this technology to create a portable engine with a capacity of 1 to 100 kW is under consideration.

6. A more detailed proposal with a specific example as a case study will help in understanding the concept as well as examining the interest of potential partners to participate in the project.

Further information about experimental results, description of technical details are possible within an agreement of cooperation.