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THE PERFORMANCE OF ENERGETIC MATERIALS ON THE BASIS OF NANOSCIENCE

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ABSTRACT

The field of nanoscience has grown immensely in the last 10 years. Nanoscience can be loosely defined as the synthesis, processing, characterization and application of materials whose dimensions are in the nanometer-size range (typically defined as 1-100 nm). A primary reason for the great interest in nanoscience is the properties of materials with nanoscale dimensions, relative to the properties of the bulk. It is well known that the mechanical, electronics, optical and catalytic properties of a material are significantly altered when the material is reduced to the nanometer size region. The alterations of properties occur because properties of materials have a threshold dimension size scale below which the physics of the property begin to change. One area of nanoscience that is currently undergoing extensive active research at many institutions is the development of energetic systems by nano energetic materials.

We are now at the threshold of a revolution in the ways in which materials and products are created. How this revolution will develop, how great will be the opportunities that nano energetic materials can yield, and how rapidly we progress, will depend upon the ways in which a number of challenges are met. Furthermore, we need to understand the critical roles that surfaces and interfaces play in nanostructure materials. we also need to be concerned with the thermal, chemical, and structural stability of nanostructure of energetic materials in the face of both the temperature and changing chemistries of the environments in which these nanostructures are asked to function.

Presentation focuses briefly on the performance of propellants and explosives based on nano metals powders and the performance, stability and sensitivity of nano monomolecular energetic materials.

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