SBIR Phase I: Flat ceramic nanoparticles with two functionally different surfaces for self-generating coatings

Award Information

Agency:
National Science Foundation

Branch:
N/A

Contract:
1315855

Agency Tracking Number:
1315855

Amount:
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Phase:
Phase I

Program:
SBIR

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2013

Solicitation Year:
2012

Solicitation Topic Code:
NM

Solicitation Number:
N/A

Small Business Information

Tribotex LLC
1008 S East st, Colfax, WA, 99111-1504

DUNS:
078507135

HUBZone Owned:
N

Woman Owned:

N

Socially and Economically Disadvantaged:

N

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Abstract

This Small Business Innovation Research Phase I project will focus on the development of ceramic nanosheets with structurally different sides (sticky/slick), which will be used to form a self-generating tribological coating for improved lubrication. This coating will be automatically created during normal operation. The controlled self-assembly of nanostructures with defined properties is one of the enabling promises of nanotechnology. The creation of these low-friction tribological coatings has been previously observed but requires further analysis and understanding for robustness and reproducibility in commercial applications. Optimization of parameters, such as size, shape, and surface dopants, is required for market application of the nearly frictionless coatings to be formed using these powders. Follow-on applications of these anisotropic nanostructures are envisioned in the areas of catalyst supports, plastic fillers, and smart materials. The broader impact/commercial potential of this project will be a technology/product for improving the performance of already existing/operating machinery. The enhanced knowledge resulting from the completion of this research will further broaden and enhance the overall scientific understanding of the applications of anisotropic layered nanomaterials. Upon successful commercialization, various industrial and commercial clients will benefit from increased component longevity and more efficient operation of machinery, coupled with labor and energy savings. From a societal perspective, this technology aims to save a considerable amount of energy lost due to friction, while simultaneously reducing wear-related material/component failures and associated costs. Other researchers have predicted that a system-wide application of the proposed technology in existing transportation systems will enable energy savings that exceeds the total energy generated by all deployed wind, biomass, geothermal and photovoltaic sources combined.

* Information listed above is at the time of submission. *