



Inventors

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Large Scale Hypersonic Particle Deposition System

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Background

Functional coatings are essential to the development of next generation products in the textile, display, automotive, energy, and health care industries. While the performance of nanomaterial coatings is widely successful in the lab, there is no general method to form these coatings at a larger scale. Current attempts lack precision, scalability, and control. Therefore, there is a need to design a precise, controllable coating system that scientists can implement large-scale.

Invention Description

Researchers at ASU have developed a nanomaterial film manufacturing technology based on hypersonic particle deposition (HPD) that permits large-scale production. The HPD system begins by aerosolizing, accelerating, and then throttling a nanomaterial, which results in the formation of a curtain of nanoparticles directed towards a target substrate. The nanomaterial adheres to the substrate and forms a thin uniform layer of coating. By adjusting process conditions, researchers are able to control and tune the porosity of the deposited film, which helps create corrosion-resistant coatings. Overall, the novel HPD system can effectively apply nanomaterial coatings at the industrial scale.

Potential Applications

- Thermal barrier coatings
- Active layers in electronics
- Optical layers in laser mirrors
- Biocompatible coatings on medical implants

Intellectual Property

Status:

Pending

Benefits and Advantages

- **Effective** – The HPD system can uniformly deposit nanomaterial on large areas and has the flexibility to work with multiple types of material
- **Scalable** – The HPD system makes it possible to coat substrates using nanomaterial at industrial scale
- **Controllable** – By adjusting process conditions, researchers can tune the porosity and obtain advantageous chemical properties like corrosion-resistance

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