Engineering and Physical Science

TechTransfer and Ventures

Advanced Magnetron Sputtering System

Creation of Core-Shell Structures on Powders and Surfaces

Magnetron sputtering is a commonly used plasma vapor deposition (PVD) method used in commercial material modification. PVD method uses a gaseous plasma in a confined vacuum to knock off ions from a target material (near the cathode) and those ions are then used to coat the substrate material (near the anode) to generate a thin conformal film. Although this conventional approach can coat a substrate with almost any material, there are severe limitations to the adaptation of this PVD. Moreover, magnetron sputtering uses strong magnetic fields near the target to maintain a high plasma concentration and increase sputtering efficiency, while reducing substrate damage. However, there are severe limitations to the adaptation of plasma vapor deposition method for non-flat and complex geometric materials like round powders.

The Technology

Researchers at Virginia Commonwealth University have developed and tested a novel sample holder that can be adapted to almost any magnetron based sputtering system to create conformal coatings on powder materials. The resulting core-shell material properties can be tuned by a series of biasing approaches built into the sample holder. This process creates materials that are not currently available with commercial instruments. Furthermore, this holder can improve the ionization rate of DC and HiPIMS PVD processes for flat materials and can control the microstructure of the coating material, which can be extremely useful in reactive coating applications like in advanced manufacturing and catalyst development.

Benefits

- Control of microstructure
- Increased ionization efficiency
- Coating of round materials

Applications

- Additive manufacturing
- Catalyst development
- Advanced material development

IP Status:

US20240337009A1

License Status:

This technology is available for licensing to industry for further development and commercialization

Category:

Material Science

VCU Tech #:

LON-21-103

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