TECHNOLOGY OFFER

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Coating of powder or fine grain particles by magnetron sputtering

BACKGROUND

Magnetron sputtering is one of the most widely used methods for thin film deposition. It can be utilized to manufacture nearly every metal coating or metal composite as well as nitride, oxide, carbide, fluoride and arsenide layers with controlled stoichiometry, thus making magnetron sputtering a most versatile coating method. The possibility to coat large area substrates and the easy-to-handle process parameters of magnetron sputtering enable a wide range of industrial applications.

Figure 1: Special shaped inner vessel in a bigger rotating vessel

TECHNOLOGY

Researchers at TU Wien developed a method to coat particles and powders of nearly any size and shape by magnetron sputtering. Depending on the particle size even particles <1 µm can be coated and film thicknesses from 0.1 to 100 nm can be achieved with uniform film thickness distributions. At the moment an amount of up to 1 litre of powder can be coated in a single run, either with pure metal, compound materials (oxides, nitrides etc.) or two different materials at the same time. With this method adhesive coatings, wear resistant coatings, conductive and magnetic coatings, optical coatings, catalytic coatings and other surface modifications including complex multilayer compositions can be applied on powder shape substrates.

BENEFITS

- Applicable for nearly every shape and size of powder
- Metal and composite coatings
- Easy to handle
- Non-destructive method (for fragile particles like glass microspheres)
- Scalable

APPLICATIONS

- Abrasives
- Compound materials
- Adhesives in compound materials

DEVELOPMENT STATUS:
Prototype with coating volume 1 l available, ready for industrial implementation. Further scale up ongoing.

KEYWORDS:
- Metallic and compound coatings
- Powders, particles, diamonds, spheres
- Granular material
- Multilayer thin films
- Magnetron sputtering

IPR:
Patents pending, AT513.037 granted in Austria

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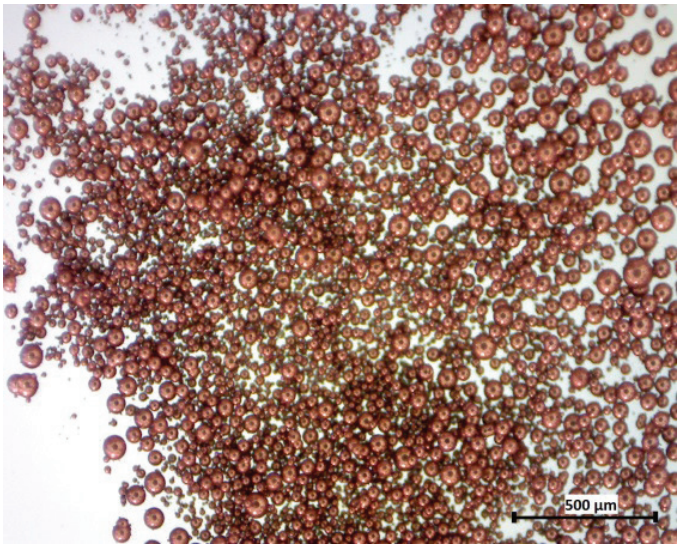

Figure 2: Copper coated spheres

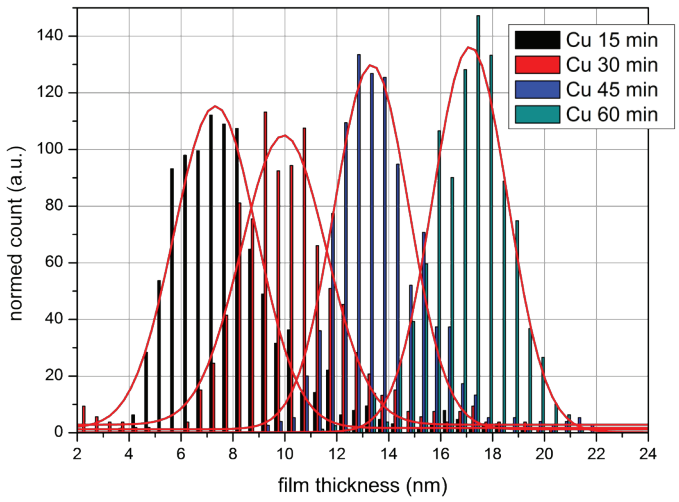

Figure 3: Film thickness distribution of copper coated spheres (~20 µm diameter), different coating times