



## TECHNOLOGY

# Method for Making Spherical Pure Metal Micro and Nanoscale Powders by Spray Pyrolysis

## OVERVIEW

The production of spherical nanoscale particles has drawn considerable interest from the electronic packaging and semiconductor processing industries. For example, spherical nanoscale particles may be used as standards for characterizing nanoscale defects formed during electronic processing. Currently, the most competitive production technology involves spray pyrolysis using hydrogen gas as a reducing agent. Unfortunately, hydrogen is very dangerous at high temperatures (above 500 degrees C) creating a significant fire hazard. Additionally, the potential for an explosion of a flammable hydrogen-air mixture is very high.

Researchers at the University of Maryland and the National Institute of Standards and Technology have developed a method for making spherical, pure nanoscale metal particles, such as copper, nickel, cobalt, and palladium, using spray pyrolysis without the use of hydrogen as the reducing agent. Any soluble metal precursor can be used in the method as long as it is inactive with respect to the carrier gas used to form the aerosols. For example, metallic nitrates and acetates are suitable precursors in the solvent systems of the new method. Each precursor can be chosen by its solubility limit with respect to the desired solvent to get a specified final product metal. The key point of the method is the composition of the solvent mixtures, which produce reducing atmospheres in high temperatures. The new method is applicable for producing large quantities of pure metallic particles without the accompanying safety hazards associated with conventional techniques.

See US Patent No. 6,679,938

For additional information, please contact the Office of Technology Commercialization, University of Maryland, College Park, MD 20742. TEL: (301) 405-2555 E-MAIL: [otc@umd.edu](mailto:otc@umd.edu).

## CONTACT INFO

UM Ventures  
0134 Lee Building  
7809 Regents Drive  
College Park, MD 20742  
Email: [umdtechtransfer@umd.edu](mailto:umdtechtransfer@umd.edu)  
Phone: (301) 405-3947 | Fax: (301) 314-9502

## Additional Information

### INSTITUTION

University of Maryland, College Park

### CATEGORIES

- Nanotechnology + Nanoparticles + Nanomaterials

### EXTERNAL RESOURCES

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