Templated Synthesis Of Metal Nanorods

Tech ID: 32618 / UC Case 2012-329-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,937,556	04/10/2018	2012-329

FULL DESCRIPTION

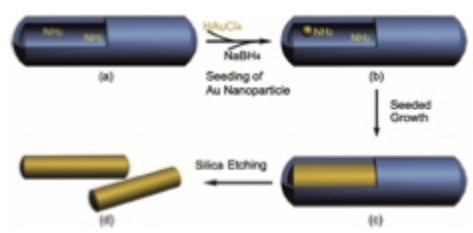
Background

Nobel material (Gold, Silver, Platinum and Palladium) nanorods have garnered great interest and specifically gold nanorods because of their plasmonic activity. Conventional synthesis methods either rely on solution phase reactions or templating methods. Typical limitations of commonly used templating methods include:

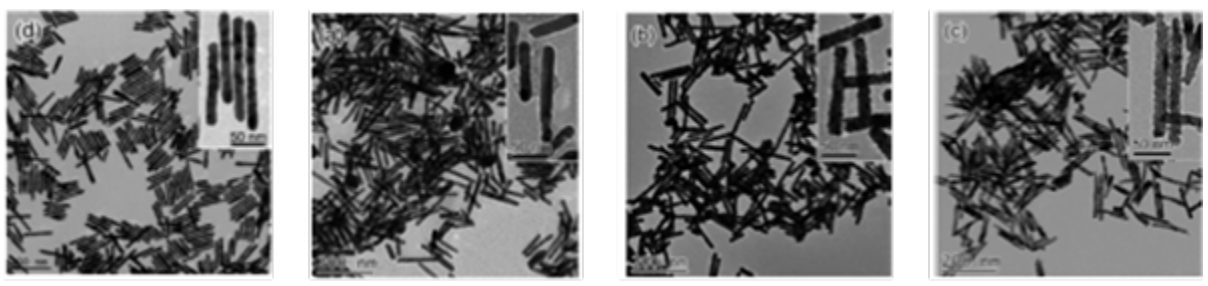
- Difficulty in controlling both the width and length of the products.
- Low yield because only a monolayer of metal nanorods could be prepared.
- High cost associated with these templates.

Current Invention

UCR inventors led by Prof. Yadong Yin have developed a patented, robust templating approach to the synthesis of metal nanorods including Gold (Au), Silver (Ag), Platinum (Pt) and Palladium (Pd) in composition with well controlled dimensions and high yield. The success of this method is attributed to the application of silica nanotube templates with tunable dimensions. In addition to the synthesis of well defined templates introducing Au seeds exclusively into the cavities of these templates is another indispensable step.



Picture above shows the general templating approach to the synthesis of metal nanorods.



Picture above shows TEM images of, from left to right, Gold, Silver, Platinum and Palladium prepared by seeded growth in silica nanotubes.

ADVANTAGES

- High scalability

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OTHER INFORMATION

KEYWORDS

Seed-mediated growth, Shape controlled synthesis, Gold nanorods, Platinum nanorods, Nanoparticles, Nanocrystals

CATEGORIZED AS

- **Optics and Photonics**
  - All Optics and Photonics
- **Biotechnology**
  - Bioinformatics
- **Imaging**
  - Molecular
- **Materials & Chemicals**
  - Chemicals
  - Nanomaterials
- **Medical**
  - Diagnostics
  - Imaging
  - Research Tools
- **Nanotechnology**
  - Electronics
  - Materials
  - Tools and Devices
- **Sensors & Instrumentation**
  - Analytical
  - Biosensors
  - Scientific/Research

RELATED CASES

2012-329-0

- Low cost - as the silica nanotubular templates can be obtained in large quantities at low cost.
- The unique seeding process affords high yield.
- The growth solutions are highly stable.
- Well controlled aspect ratios for the developed metal nanorods.

SUGGESTED USES

- Opto-electronic devices
- Biological and Chemical sensing
- Cellular imaging
- Therapeutics

RELATED MATERIALS

- Templated Synthesis of Metal Nanorods in Silica Nanotubes

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