

Transmission Electron Microscopy (TEM)

Category:

C. Particle Characterisation in and ex-situ and/or

Institute: Institut Català de Nanotecnologia (ICN)

Location: Campus UAB

Contact Details of Technology Expert:

Jordi Piella

Tel. +34-93 737 46 24

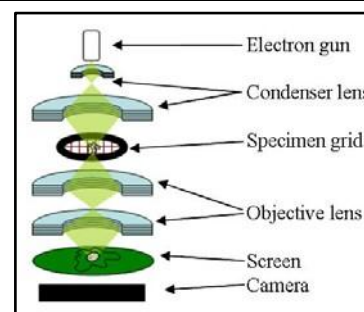
Email: jordi.piella@icn.cat

Short technology description/Overview:

TEM is the primary characterization method for determining the size and shape of nanoparticles. TEM is an imaging technique where a beam of electrons is transmitted through a specimen, in our case the NPs. Then, an image is formed, magnified and directed to be detected by a sensor such as a CCD camera that provide us with the corresponding photo of the sample.

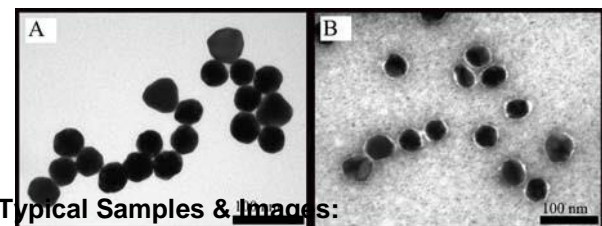
Sample preparation and experimental procedure.

- Samples for TEM are prepared by drop casting on carbon coated cooper TEM grids, and the grids are left to dry at room temperature. Samples in powder form are resuspended in water or ethanol prior to cast onto the grid.
- TEM images are acquired with a JEOL 1010 Electron Microscope operating at an accelerating voltage of 80 kV. HRTEM can be performed on a JEOL2010F field emission gun microscope operated at 200 kV. High Angular Annular Dark Field (HAADF) and Scanning TEM (STEM) are obtained on a JEOL2100 operated at 200 kV equipped with an energy-dispersive X-ray spectroscopy (EDX) detector.
- Observations are made on different parts of the grid and images are captured from 20K to 500K magnifications.
- Depending on the sample and sample preparation, 20 to 2000 nanoparticles could be captured per image. Using f.i. Image J open source software, more than thousands of particles can be computer-analyzed and measured to calculate the size distribution of the samples.

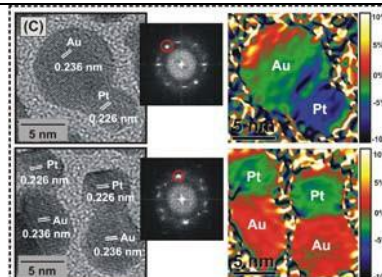


Main Features (Equipment Capabilities):

- morphology of inorganic core of the conjugates (3D Tomo)
- • proteins after staining
- • size and shape distribution
- • chemical composition (EDS, EELS, Z-Contrast, HAADF, Geometrical Phase Analysis (GPA))



Au NPs before and after negative staining with 1% uranyl acetate



Geometrical Phase Analysis (GPA) of Au-Pt heterodimers

Any further Information: