



AAFM is a high-resolution imaging technique used to study the surface morphology of materials at the nanoscale.

-

XRD is used to determine the crystalline structure, phase identification, and orientation of materials.

-
- B)** XRD patterns of ZnO and ZnO:Ag thin films. The top pattern (blue line) is for ZnO (nanorods) and the bottom pattern (red line) is for ZnO:Ag (nanorods). Both patterns show peaks corresponding to the hexagonal wurtzite structure of ZnO. The peaks are indexed as [100], [002], [101], [102], [110], [103], and [112]. The ZnO:Ag pattern shows an additional peak at [111] and a broad peak around 20 degrees, indicating the presence of Ag nanoparticles.

XRF is a non-destructive technique for determining the elemental composition of materials.

-

PL measures the light emitted by a material when excited by a light source, used to analyze optical and electronic properties.

-
- Wide Scan, 40 nm
- b)

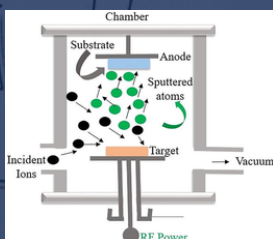
FESEM provides high-resolution images of material surfaces, while EDX identifies the elemental composition.

-
- Figure 1 consists of four panels, (a) through (d), each showing a scanning electron micrograph (SEM) of a different sample. Each panel includes a large SEM image and a smaller inset showing a 3D schematic of the hierarchical structure. The samples are: (a) PAA, (b) PAA/PAA, (c) PAA/PAA/PAA, and (d) PAA/PAA/PAA/PAA. The 3D schematics use a color-coded legend to represent different components: blue for the primary structure, green for the secondary structure, and yellow for the tertiary structure. The SEM images show the morphology of the samples, which appear as a network of interconnected fibers or rods. The insets provide a detailed view of the hierarchical structure, showing how the primary, secondary, and tertiary structures are interconnected.

Sputter Coating

Sputter coating involves applying a thin metallic layer to a material's surface, often for analysis purposes.

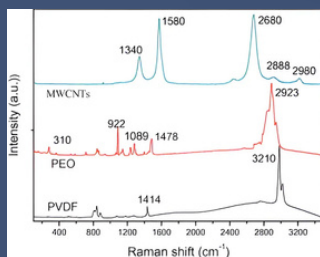
- Enhancing conductivity for SEM imaging.
- Thin film deposition for material testing.
- Creating uniform surfaces for detailed examination.
- Benefits: Ensures high-quality imaging and analysis, especially for non-conductive samples.



Raman Spectroscopy

Raman spectroscopy examines vibrational, rotational, and other low-frequency modes in a material.

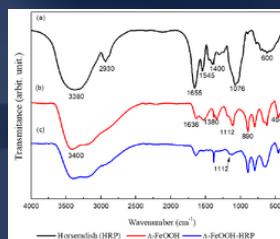
- Material phase and crystallinity studies.
- Carbon structure analysis (e.g., graphene, carbon nanotubes).
- Identifying material stress and strain.
- Benefits: Non-destructive and complements other spectroscopic techniques.



Fourier Transform Infrared Spectroscopy (FTIR)

FTIR identifies chemical bonds and molecular structures by measuring infrared absorption.

- Identifying organic and inorganic compounds.
- Quality control in polymers, pharmaceuticals, and chemicals.
- Studying functional groups in materials.
- Benefits: Provides rapid, precise molecular characterization.



References

- Cruz Pacheco, Andrés & Quinchia, Jennifer & Orozco, Jahir. (2023). Nanostructured poly(thiophene acetic acid)/Au/poly(methylene blue) interface for electrochemical immunosensing of p53 protein. *Microchimica Acta*. DOI :190. 10.1007/s00604-023-05683-5.
- Tássia Silva Tavares 1, Eduardo Pereira da Rocha 1, Francisco Guilherme Esteves Nogueira 2 DOI : 10.3390/molecules25020259
- Veeradasan.P et al., A new nano- worm structure from gold-nanoparticle mediated random curving of zinc oxide nanorods
- Thevendran.R et al., Gold-Hybridized Zinc oxide nanorods as Real-time Low-cost nanoBiosensors for Detection of virulent DNA signature of HPV-16 in cervical carcinoma
- Samantha.S et al., Non-invasive Materials Analysis Using Portable X-ray Fluorescence (XRF) in the Examination of Two Mural Paintings in the Catacombs of San Giovanni, Syracuse
- Veeradasan.P et al., Characterization of Gold-Sputtered Zinc Oxide Nanorods—a Potential Hybrid Material
- Humaira Ghazal and Nadeem Sohail DOI : 10.5772/intechopen.107353
- I.S. Elashmawi,Laila Gaabour,DOI:10.1016/j.rinp.2015.04.005

Why Choose Our Services ?

- **Comprehensive Solutions:** We offer a wide range of services covering structural, elemental, and optical properties.
- **ExpertSupport:** Experienced professionals to guide and interpret results for your specific needs.