

frank.grill@ub.edu → synthesis of ZnO nanowires: optical spectroscopy

and applications.

Motivation: ZnO

- ZnO is unique because it offers a multitude of functional properties and applications together with high availability, low price and the absence of toxicity.
- ZnO crystallizes in the wurtzite structure and, as a consequence, it is both pyroelectric and piezoelectric.

$ZnO \rightarrow$ óxido de zinc.

The key goal of ZnO nanostructure.

Synthesis → chemical vapor deposition (CVD)

"Epitaxis"

~~substrato~~
~~luz~~ → crecimiento
→ cristal

Vapor - Liquid - Solid (VLS)

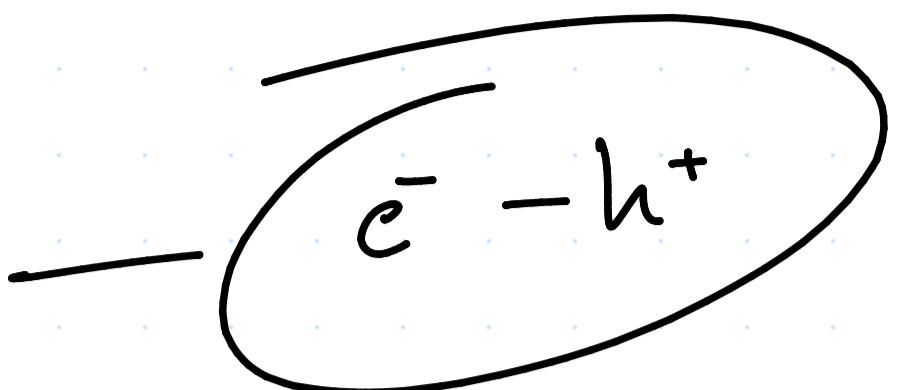
Tamaño → catalizador → tiempo de crecimiento.

Densidades de nanoclusters

optical Emission at RT from high density ensemble of ZnO

NWs

Exciton



Par branch

Pumping at 325 nm, we observed two emission bands, one in the UV associated to an exciton around 380 nm (3.26 eV), and a branch one in the visible from 420 to 700 nm.

optical Emission at RT from a single ZnO NW.

Pumping at 365 nm, t...

SNOM: Scanning Near-field optical microscopy

A SNOM microscope is a SPM where the probe is a metal-coated optical fiber with a nanometric aperture at its end (50 - 80 nm).

* The oscillating tip is held close to the surface (~5 nm) by

a phase controlled feedback.

3D view of the topography ...

Topography image of a single ZnO NW on a SiO_2/Si substrate, and corresponding PL-SNOM images at 365, 520 and 590 nm.

• Topography image of a single ZnO NW on a ...

SNOM: spectrally Resolved PL (Transmission collection mode)

Topography image of a single ZnO NW on a sapphire substrate, and corresponding PL-SNOM images at 365, 520 and 590 nm.

Grad sensing properties against oxidizing (NO_2) and reducing ($I + OH$).