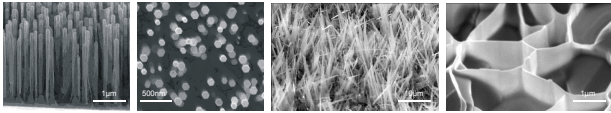


Our Research Topics

Self-Assembly of Complex Nanostructures

SANDIE

Growth of ZnO micro- and nanostructures

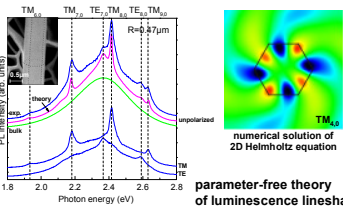


Arrays of nanowires, control of diameter

nano-grass

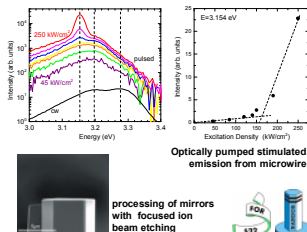
nano-walls

Whispering gallery modes in nanowires



parameter-free theory of luminescence lineshape and degree of polarization

Nanorod-based lasers



Optically pumped stimulated emission from microwire

processing of mirrors with focused ion beam etching

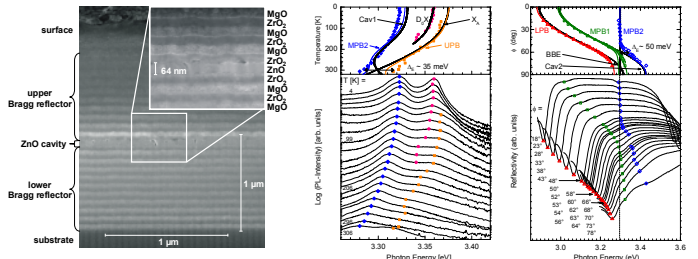
Quantum Gases at Room Temperature

Strong coupling of light and matter in microcavities made from all-oxide Bragg mirrors and ZnO-based electronic excitonic oscillator



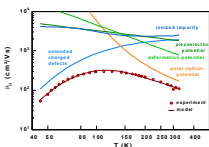
dielectric Bragg mirrors from MgO/ZnO₂

Towards Bose-Einstein condensation of exciton-polaritons at room temperature
large mode splitting > 50meV
possible Rabi splitting > 100meV

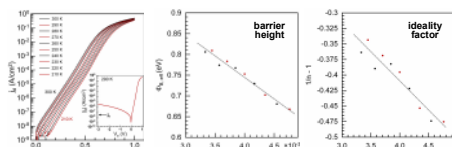


Control of Conductivity in Wide Bandgap Semiconductors

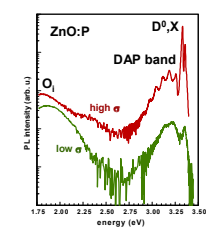
Electron mobility in n-ZnO thin films



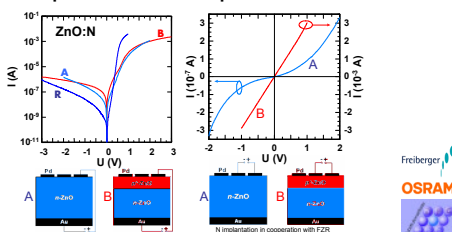
Temperature dependent properties of Pd/ZnO Schottky diodes



p-doping of ZnO with P



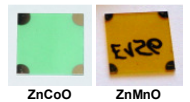
ZnO pn-homodiode with p-ZnO:N



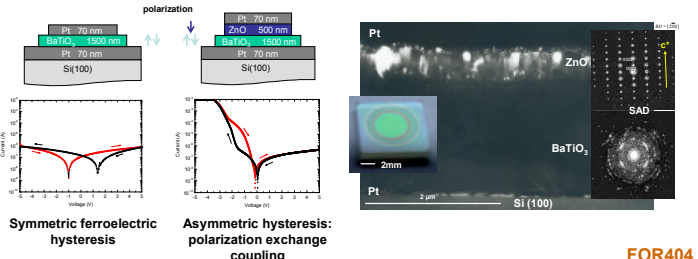
Freiberger OSRAM

Multiferroic All-oxide Heterostructures

Heterostructures of multifunctional oxide materials
ferroelectric (BaTiO₃), ferromagnetic (ZnCoO, ZnMnO),
pyroelectric (ZnO, MgZnO), insulating (MgO, Al₂O₃),
superconducting (YBCO)



Novel effects
coupling of electrical polarizations (spontaneous and switchable)
switching of ferromagnetism (via density of itinerant charge carriers)
interface effects (2D electron gases, magnetotunneling)

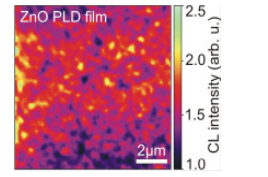
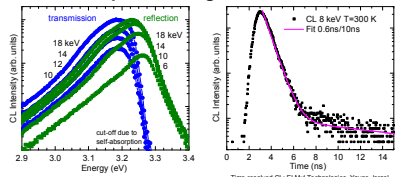


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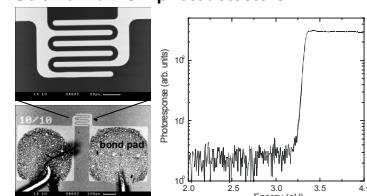
Transparent Devices

Fully transparent photonic and electronic devices
such as diodes, transistors, photodetectors, LEDs, lasers

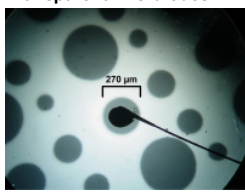
Fast, GHz-speed homogeneous ZnO thin film scintillators



Solar-blind MSM photodetectors

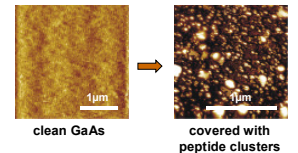


Transparent ZnO diodes



Hybrid Systems of Inorganic and Organic Matter

Selective attachment of peptides to semiconductor surfaces



Surface recognition depends on base sequence/peptide conformation and surface ionicity

