
HL 51: Invited Talk: Jürgen Christen

Time: Wednesday 9:30–10:00

Location: H15

Invited Talk

HL 51.1 Wed 9:30 H15

Nano-scale characterization of semiconductors using helium temperature scanning transmission electron microscopy cathodoluminescence — •JÜRGEN CHRISTEN, GORDON SCHMIDT, PETER VEIT, FRANK BERTRAM, and MARCUS MÜLLER — Institute of Experimental Physics, Otto-von-Guericke-University, Magdeburg

For a detailed understanding of complex semiconductor heterostructures and the physics of devices based on them, a systematic determination and correlation of the structural, chemical, electronic, and optical properties on a nanometer scale is essential. Luminescence techniques belong to the most sensitive, non-destructive methods of semiconductor research. The combination of luminescence spectroscopy -

in particular at liquid He temperatures - with the high spatial resolution of a scanning transmission electron microscopy (STEM) ($dx < 1$ nm at RT, $dx < 5$ nm at 10 K), as realized by the technique of low temperature scanning transmission electron microscopy cathodoluminescence microscopy (STEM-CL), provides a unique, extremely powerful tool for the optical nano-characterization of semiconductors, their heterostructures as well as their interfaces. Our CL-detection unit is integrated in a FEI STEM Tecnai F20 equipped with a liquid helium stage and a light collecting parabolic mirror. Panchromatic as well as spectrally resolved CL imaging is used, both collected simultaneously with the STEM signal at each pixel. Typical results on challenging structures will be presented.