FAKULTÄT FÜR CHEMIE

universität wien

Einladung zum Gastvortrag
im Rahmen des Seminars Chemie und Technologie der Materialien von

---

Univ.-Prof. Dr. Gottfried Strasser
Technische Universität Wien

„Monolithically Integrated Mid-infrared Nanosensors"

This talk aims to give a short introduction in the field of quantum cascade devices with a strong focus on quantum cascade lasers (QCLs) and quantum cascade detectors (QCLs). A bi-functional QC structure will be presented [1,2], that can be operated in two modes, as coherent light emitter as well as intersubband detector, depending on the bias applied to the structure [3].
This opens the way to on-chip sensing solutions with a high inte-gration density [4]. Liquid sensing at room temperature with a mono-lithic integrated sensor was achieved by a QCL, a dielectric loaded Surface Plasmon Polariton (SPP) waveguide as interaction section of the infrared light with the liquid, and a QCD.
To demonstrate gas sensing with the same technology a surface emitting and detecting sensor was processed using the very same heterostructure material. A distributed feedback ring quantum cas-cade laser is integrated on-chip with a detector element. The surface emitted light is collimated, guided through a gas cell, back reflected by a flat mirror, focused, and detected by the sensor element on the very same device. The surface operation mode enables for comparable long interaction lengths as needed for gas absorption measurements [5].

[1] Schwarz, B. et al., Sensors 13, 2196, 2013 [2] Schwarz, B. et al., Appl. Phys. Lett. 107, 071104, 2015
[3] Schwarz, B. et al., Nat. Commun. 5, 4085, 2014 [4] Ristanic, D. et al., Appl. Phys. Lett. 106, 041101, 2015
[5] Harrer, A. et al., Scientific Reports 6, 21795, 2016

Freitag, 24. Juni 2016, 14:00 Uhr
Seminarraum 2 der Fakultät für Chemie
Währinger Straße 42, 1090 Wien

Wolfgang Kautek
Institut für Physikalische Chemie

Bernhard Keppler
Dekan

Lothar Brecker
Vizedekan

Veronika Somoza
Vizedekanin