FINAL PROGRAM

42nd International Conference on Micro and Nano Engineering

September 19-23, 2016

Reed Messe Wien, Congress Center

Vienna, Austria

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In this work, a model has been established to simulate the performance of In0.52Al0.48As/In0.53Ga0.47As/InP pHEMT whose gate length changes from 100 nm to 10 nm, we use new methods to define the effective gate length and study the relationship between real gate length and effective gate length, and then we illustrate how this relationship influences the device cut-off frequency. According to the results, we have found that fT may still increase by reducing the real gate length to 10 nm while the effective gate length reaches to around 20 nm.

15:30 – 16:30 D2 Lab-on-a-Chip

STOLZ

Session Chair: Silvan Schmid

15:30 D2-1-inv

A monolithically integrated mid-infrared lab-on-a-chip

Benedikt Schwarz[1], Borislav Hinkov[1], Daniela Ristanic[1], Peter Reininger[1], Dr. Hermann Detz[2], Aaron Maxwell Andrews[1], Werner Schrenk[1], Gottfried Strasser[1]
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Dielectric-loaded mid-infrared plasmonic waveguides are perfectly suitable for on-chip sensing of fluids. They allow long propagation lengths and a large mode overlap above 96% with the analyte. Dielectric-loading is an alternative approach to increase the confinement of mid-infrared surface plasmons without the need for sub-wavelength patterning like for spoof plasmon waveguides. Direct excitation and detection is realized using optimized and chip-integrated quantum cascade laser and detector technology, enabling the realization of a monolithically integrated mid-infrared lab-on-a-chip.
A prototype sensor device is capable of real-time detection of water in isopropanol for a large range of concentrations between 0% to 60% with 50 ppm resolution.

16:00 D2-1-1

Integrated hollow microneedle-optofluidic biosensor for minimally-invasive low-volume therapeutic drug detection

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We have developed a microneedle-optofluidic biosensor (MOB) to determine analyte concentrations in sub-nanoliter volumes of biological fluids obtained through dermal fluid extraction. Hollow metal microneedles, with biofunctionalized inner lumen, are capable of trapping target analytes in a 0.6 nL volume (i.e. the lowest analyte volume reported for biosensing with microneedle technology) and housing an enzyme-linked immuno-assay inside the microneedle lumen (0.06 mm2 area). The MN are incorporated into an optofluidic device that allows rapid quantification (within minutes) of analytes at a large dynamic range, high sensitivity and low limit of detection (4 µg/mL) relevant to detect typical drug concentrations in the skin. The proposed MOB represents a rapid, extremely compact, minimally-invasive, and potentially handheld device for point of care drug monitoring.

16:15 D2-1-2

UV-NIL of a water-soluble resist for nano-patterning of proteins

Marco Lindner[1,2], Violeta Tacheva[1,3], Aliz Tresztenyak[1], Adrian Prinz[1], Gergö Fülöp[2], Andreas Arnold[2], Eva Sevcsik[2], Günter Lepperdinger[3], Gerhard Schütz[2], Iris Bergmair[1]
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