Hochschule Kaiserslautern
University of Applied Sciences

Applied Research Center

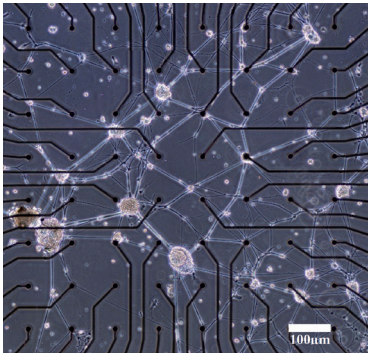
Integrated Miniaturised Systems

IMS

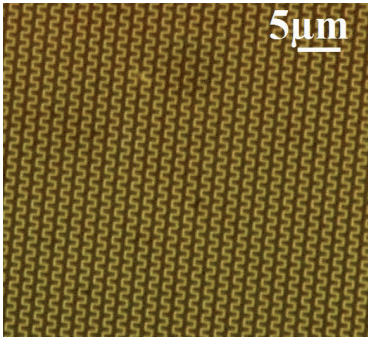
Development of 3D-ultramicro and 3D-nano electrodes for biomedical applications

The measurement of single cell contact of electrically active cells can help to develop new types of diagnostics and therapies, e.g. for cardiac arrhythmia or neurodegenerative diseases.

In this project new shapes of micro and nano electrodes are fabricated to enlarge the contact between cell and electrode, thus increasing the signal-to-noise ratio and improving the detection limit. Multi electrode arrays (MEAs) are structured with porous alumina templates or processed with nanoimprint lithography. Then these patterns are filled with gold or platinum by electrochemical deposition. Subsequently the resulting electrodes are characterized with scanning electrode microscopy and atomic force microscopy to verify the micro and nano features; electrochemical impedance spectroscopy is used for the characterization of the electrical properties.
Biocompatibility and drug tests with living cells are performed to demonstrate the reliability of the experimental set-up and to get specific cell reactions.



MEAchipwith cells



NILfabricated meander structures

Project duration:
01/09/2013 – 31/08/2016

Project management:
Prof. Dr. Monika Saumer
Hochschule Kaiserslautern
Amerikastraße 1
66482 Zweibrücken
Germany

phone: +49 (0)631/3724-5420
fax: +49 (0)631/3724-5305
e-mail: monika.saumer@hs-kl.de

Project partners:
thinXXS Microtechnology AG – Zweibrücken
Endotherm GmbH - Saarbrücken

Funding:
Stiftung Rheinland-Pfalz für Innovation

IMS

hs-kl.de/ims