

Electrochemical (Bio)Sensing using Graphene with Integrated Microfluidics

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Complex of Topics: A1

Short version

The use of nanomaterials as electrode / device components is fundamentally important for the design of novel chemical sensors and biosensors, especially for future lab-on-a-chip systems. The aim of this project is to systematically explore the use of graphene monolayers as nanostructured electrodes for on-chip electrochemical sensors. Individual graphene nanostructures on silicon or glass chips will function as working electrodes, integrated in a microfluidic electrochemical flow cell. The first part of the project will focus on comparing the performance of the realized sensors with classical sensors involving micro- / macro- structured electrodes. In the second part, the goal is to realize strategies to improve sensor performance through controlled chemical functionalization, for e.g. through nanoparticle modification.

In order to carry out this project a very good understanding of various aspects of electrochemistry is necessary and hence the candidate is expected to be highly motivated in this subject. Knowledge or experience with microfluidics and sensors will be a big advantage.