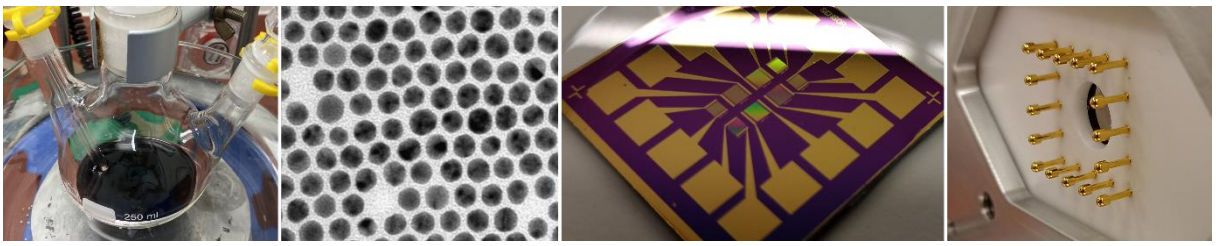
Title: Chromatographic sensors obtained by vertical integration of nanoparticle composites

Abstract, if applicable figure (max. 2000 characters)**:**

Within the DFG funded Research Training Group 2767 we aim at improving the selectivity of gas sensors by making use of their response kinetics. Current state of the art commercialized gas sensors provide high sensitivities, but can hardly identify the composition of gas mixtures. Recently, nanoparticle-based systems that use kinetic response features have proven to be beneficial for the discrimination of gaseous analytes.[1] Within this project, new types of nanocomposite sensors shall be developed that enable intrinsic fractionation of volatile organic compounds via mass transport within vertically stacked nanomaterial films. This approach has the potential to improve low-cost and portable gas sensor technology. It is demanded by applications in medicine for the early diagnosis of diseases via breath analysis and personalized health care, the food industry for shelf-life monitoring, security for the detection of hazardous substances and environmental monitoring.



Supervisor:

Skills that you should already have:

- Independent and safe work in chemical labs
- General understanding of colloidal chemistry
- Excellent communication skills

Skills that you will acquire during the internship:

- Nanoparticle synthesis and characterization
- Deposition of nanoparticle composite films
- Fabrication of microstructures via photolithography
- Sensor characterization

Dual-use /export control relevance:

This project is considered fundamental science and hence not object of dual use research of concern or foreign trade laws. If the object of the research matures to an application focused development safety-related aspects will be re-evaluated, specifically taking into account the current German and EU dual use regulations.

References

[1] H. Schlicke, S. C. Bittinger, H. Noei, T. Vossmeyer, *ACS Appl. Nano Mater.* **2021**, *4*, 10399−10408.