Student assistants for assembly and patterning of MoS_2/graphene heterostructures (m / f / d) (9 hours / week)

Student assistant 1 (no degree) is needed for the following experiments:

1. Scale up production of heterogeneous structures using the established sample preparation protocols;
2. Screening the different photoactive organic linkers for the cross-coupling reactions.

These proposed experiments involve a large amount of meticulous work on sample preparation, purification (repeated centrifugation and separation), and quality evaluation (basic characterization with UV-Vis and IR). Therefore, the contribution from the student assistant 1 can guarantee the continuous supply of good quality of materials (exfoliated nanosheets and heterostructures) for the further characterization step and facilitate the identification of optimal conditions for the construction of high-quality heterostructures, greatly speeding up the project implementation.
It should also be noted that these proposed experiments are featuring reasonable scientific technical difficulties, therefore, a student assistant with basic chemistry knowledge would be able to carry out the experiments by following on the planned protocols. On the other hand, the student will be trained with good lab practice and be acquainted with the entire production cycle of cutting edge nanotechnology, which will benefit them in their future professional work.

Student assistant 2 (with bachelor degree) is needed for the following experiments:

1. Preparation of patterned heterostructures (screening patterning conditions)
2. Characterization of patterned heterostructures using Raman, PL, and AFM.

These proposed experiments involve delicate control of chemical process and systematic analysis of materials using varied spectroscopic and microscopic techniques. Therefore, a student assistant who has strong interest in material science and has basic knowledge on the working principles of Raman and AFM would be skilled enough to tackle the research problems after a few days of training. This role will also be responsible to prepare patterned heterostructure samples for our collaborators (TEM, electronic tests, etc). The results generated from these experiments will provide a better understanding of covalently linked hetero-interface, facilitating the further material design. Most importantly, the efficient patterning strategy and advantageous charge transport in this covalently linked interface compared to well-known vdW heterostructures will be highlighted through the detailed characterization, which add more weights to the novelty and importance of proposed project.
On the other hand, the student will be trained with good lab practice and various characterization techniques, which will help them to gain more insights into the material structure and properties, and would benefit them for both thesis writing and future work.

Contact: Dr. Xin Chen (xin.chen@fau.de), Lehrstuhl Organische Chemie II, Chemikum Nikolaus-Fiebiger-Str.10, 91058 Erlangen.