

The third Zakho-German universities partnership in the field of nanotechnology

For the third year, another group of physicists from the University of Zakho visited the University of Oldenburg/Germany at interval over prolonged period (two to seven months). This was the result of a DAAD program called German-Iraqi University Twinning Program between the University of Zakho and the University of Oldenburg/Germany. The fund for this program is 200.000 € for 2017-2018 (100.000 €/year).

Although It was planned to participate 7 persons (staff of the university of Zakho), however due to visa and technical issues only 5 persons have participated. The participants are Dr. Diyar Sadiq the main coordinator of the program from the university of Zakho side, Dr. Dler Jameel, PhD student Mr. Nawzad Abdulkareem, PhD student Pshtiwan Amin and Dr. Shakir Rasheed (from the department of mathematics). During their accommodation and in their specific field, they interact with the researcher from the ultrafast nano-optics, scanning-tunneling spectroscopy and energy and semiconductor groups. The goal of the project is to deepen the already established cooperation between the group of „Ultraschnelle Nanooptik“ from the Carl von Ossietzky University of Oldenburg (CvO) and the physics department from the University of Zakho (UoZ)/ Kurdistan Region-Iraq in the field of nanotechnology.

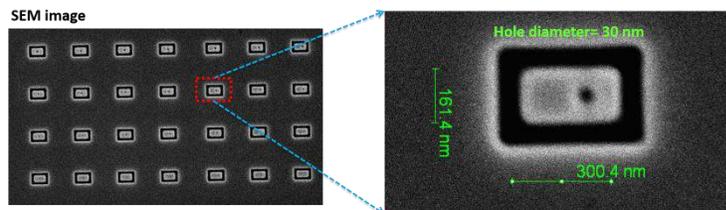
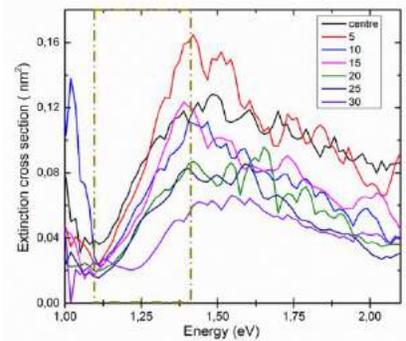


Figure 1: SEM image of the fabricated nanorod-hole (left) and the corresponded scattering spectrum (right).



The group has conducted their measurements successfully with different projects. Dr. Diyar Sadiq with his PhD student Pshtiwan Amin have worked on fabricating and investigating optical spectroscopy of a novel nanostructure (Nanorod-hole). The scattering spectrum of this nanostructure can be tuned by changing nanohole position and diameter that can be used for biological sensor. This is shown in figure 1 with the corresponding spectroscopy. In collaboration with the group "scanning probe spectroscopy (STM)" (supervised by Prof. N. Niluis), the preparation and studies of thin oxide films has been investigated by the PhD student Nawzad Abdulkareem and supervised by the "scanning probe spectroscopy" staff. The wide-ranged scanning tunneling microscope and the second project was a research and working on a specific type of organic molecules which are useful to build organic solar cells and optical sensors. He has have investigated self-assembly of a specific type of squaraine dye molecules on both (001) silver surface and (111) gold surface as shown in figure 2.

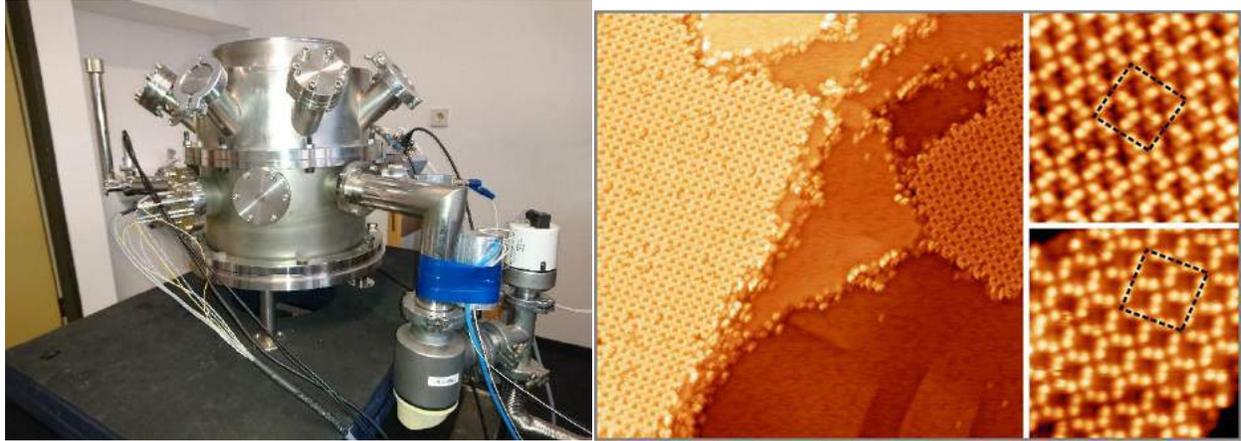


Figure 2: Constructed STM chamber (Left). A Long-ranged ordered molecular island (up to 20 nm diameter) with distinct square symmetry (right).

Dr. Dler Jameel work on measuring the so called I-V characteristic as shown in the figure 3 for SPAN/(100) GaAs and SPAN/(311)A GaAs. These samples are called Organic/inorganic semiconductor hybrid devices which are using for many applications such as solar cell, photodiodes and energy storage.

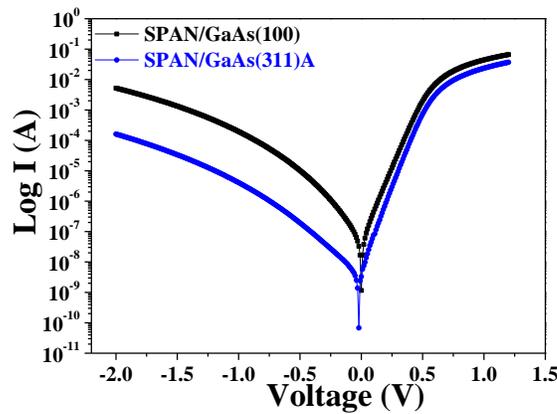


Figure 3: Semi-logarithmic plots of dark I-V characteristics of SPAN/(100) GaAs and SPAN/(311)A GaAs hybrid devices at room temperature (300 K).

At the end, a two-day Summer School on Nanophotonics" was held at "Hanse-wissenschaftskolleg" in Delmenhorst/Germany. The summer school were held to identify basic research on nanotechnology of the collaborated university. Around 30 inviters from different German universities in addition to two inviters from the department of university of Zakho have participated with a talk about their recent research. We were honored by the attendance of Dr.

Lazgin Jamil and Dr. Mahir Khalid the president and the dean of the university of Zakho, respectively. Their attendance gave us support and motivation for continuing collaborated research with our German partner. The summer school was a good chance for the staffs to communicate internationally with other scientist and researcher which promotes our staff to reconstruct the higher research, communicating results and sharing knowledge.

