

Mini-colloque  
« Last advances in semiconductor nanostructures »

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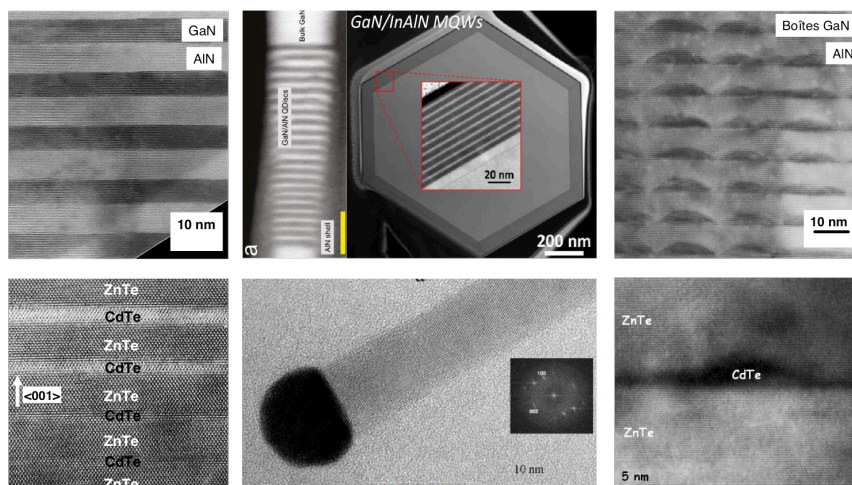
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Over the last fifty years, the development of semiconductors has considerably progressed with the integration of such materials in many daily-life applications (microelectronics, high power electronics, photonics, photodetectors, photovoltaics, etc.). Beyond the most popular semiconductors, such as Si for microelectronics and GaN for lighting awarded in 2014 by the Physics Nobel Prize, many other semiconductors including the IV, III-V and II-VI groups play key building blocks for both fundamental and applied research. Considerable efforts are focused on the elaboration of semiconductor nanostructures in order to explore new physical properties of semiconductors with the possibilities to significantly improve the current devices or to develop new types of applications in electronics and photonics. For instance, the nanostructures can contribute to the development of heterogeneous integration in microelectronics. The French research plays a key role in this topic with intense and recent activities focused on quantum wells (QWs), quantum dots (QDs) and nanowires (NWs) based on IV, III-V and II-VI semiconductors.

This symposium will be focused on last advances on semiconductor nanostructures spanning from growth to advanced structural or optical properties, and their implementation in devices. The growth methods in top-down or bottom-up approaches allowing an accurate control of nanostructure size and density in self-assembled or organized modes will be highlighted. The selective area growth is one promising approach to growth ordered nanostructure array. In parallel, advanced characterization techniques managed either on nanostructure ensembles or on single nanostructures at the nanoscale are actually developed in order to reveal growth mechanisms and to get deep structural, optical and electrical properties (morphology, composition, strain state, emission/absorption, doping level...). The device integration of such nanostructures represents an important challenge regarding electrical contact, performance and reliability issues.

This symposium represents a unique opportunity to bring together several French research communities (laboratoire d'excellence GANEX, GDR PULSE, former GDR Nanofils...) involved in the semiconductor nanostructures to present up-to-date advances gathering both fundamental and applied research.



Examples of semiconductor nanostructures in form of QWs, NWs and QDs  
for GaN/(In)AlN and ZnTe/CdTe systems