C2N General Seminar

Friday June 18h 2020- 10h 00

Amphitheater of C2N

"GaN Nanowires for Piezoelectric Generation"

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Lien public:
https://zoom.us/j/99637733548?pwd=NERpSkcxZVZ2Ui9lUEhvTG1LWXFlUT09

With the amount of connected objects constantly on a rise, it becomes critical to deal with the associated increase in energy consumption. Their energetic autonomy is today a key worldwide challenge, particularly for electronic systems operating in an environment with restricted, or even absent, electrical grid infrastructure. The miniaturization of the micro-devices for sensing and monitoring results in the reduction of their energy consumption, then opening perspectives for developing new autonomous intelligent systems.

Energy harvesting appears as a promising approach to power wireless micro-devices. Among renewable energies, the mechanical deformations and vibrations, harvested using piezoelectric materials, present the advantages to be ubiquitous and permanently available.

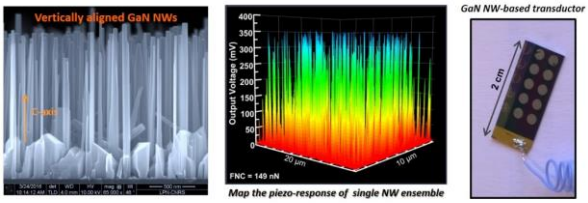

Fig.: (left) GaN NWs grown by plasma-assisted MBE; (center) 3D mapping of the output voltage generated by each GaN NWs constituting the array; (right) Picture of the GaN NW-based transductor device.

Recently GaN nanowires (NWs) have emerged as systems of interest for developing piezoelectric generators. Thanks to their superior mechanical properties, high sensitivity to applied force and exalted piezoelectric response over conventional 2D films and bulk materials, the NWs present undeniable advantages for significantly enhance the conversion efficiency of the generators.

In this presentation, we demonstrate the high potential of GaN NWs for piezo-generation. Our approach is based on systematic multiscale analyses going from the NW synthesis to the fabrication and testing of generators, passing through the characterization of the piezoelectric properties of unique NWs and the investigation of the piezo-mechanisms in play.

Dr. Noelle Gogneau received her PhD degree in physics in 2004 from the Grenoble Alpes University, France. After a post-doctoral position at EPFL, Switzerland, she joined the Laboratory for Photonic and Nanostructures (today the C2N) as CNRS researcher in 2006. From 2011, her research activities are centered on the growth of III-N NWs by PA-MBE and their characterization for Nano-Energy applications, with an emphasis on the piezoelectric properties of 1D-nanostructures for the development of a new generation of nano/piezo-generators.