NANO-PHOT

AFM "PeakForce" characterization of polyaniline-based ammonia sensors

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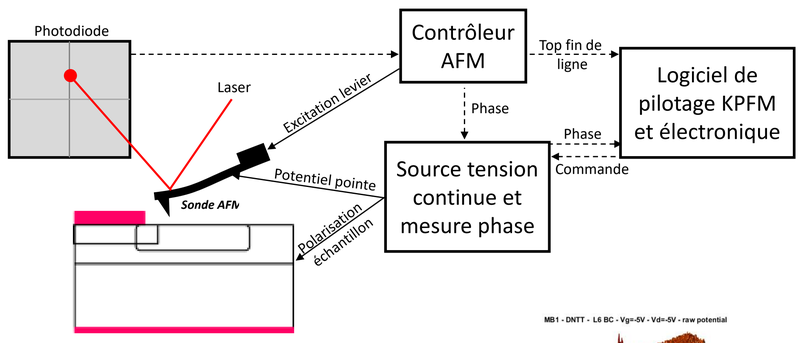
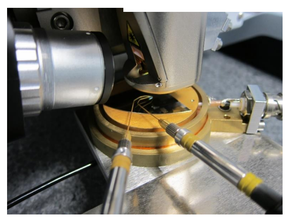
- AFM-PeakForce technique is used for the characterization of PAni-based ammonia sensor active layers
- Simultaneous and nm-scale resolution topography, electric potential, and mechanical surface properties are measured to study PAni:CSA-PU composite thin films

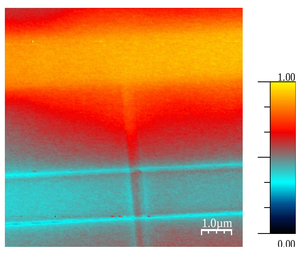
KPFM

Quantitative measurement of surface potential:

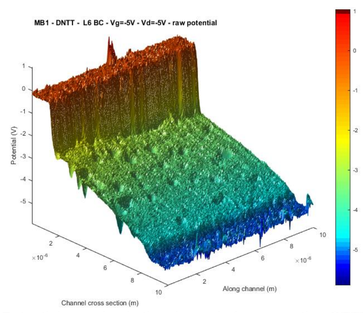
- **Device can be operating (biased) during measurement**
- **~50 nm lateral resolution**







Surface potential mapping along a biased ZnO nanowire.

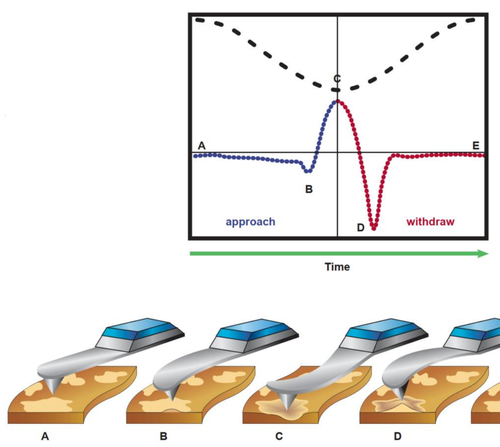


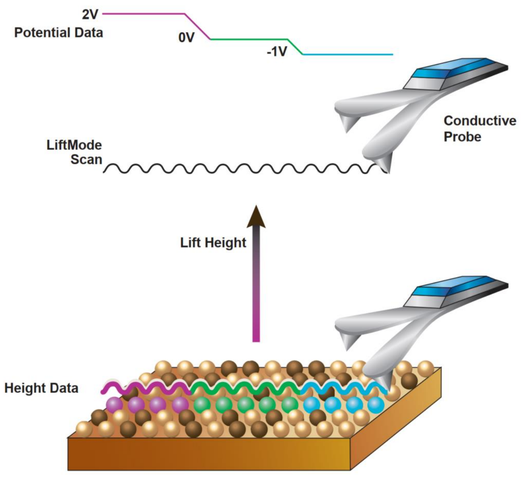
Potential mapping in the channel of an operating OTFT.

PeakForce

Allows measurement of topography, electrical and mechanical surface properties at the nanoscale*

- **Simultaneous mappings**
- **nm-scale resolution**

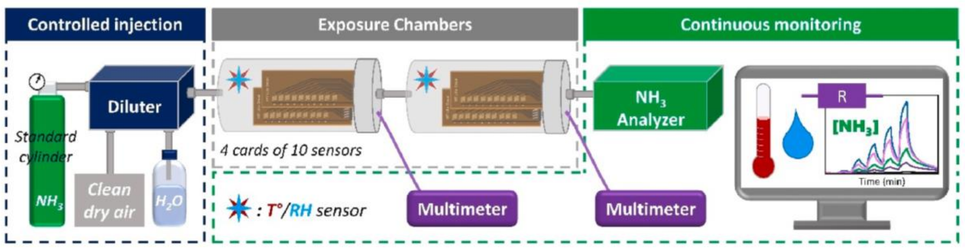


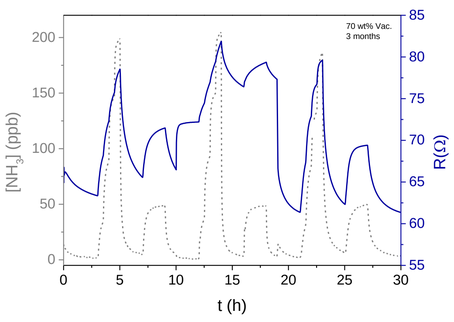


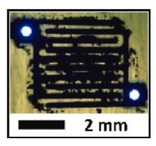
(*) The Definitive AFM Modes Handbook, Bruker

PAni:CSA-PU based ammonia sensors

- **Experimental set-up used to assess the detection performances of the sensors.**



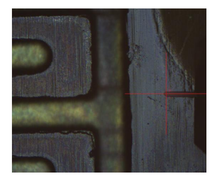


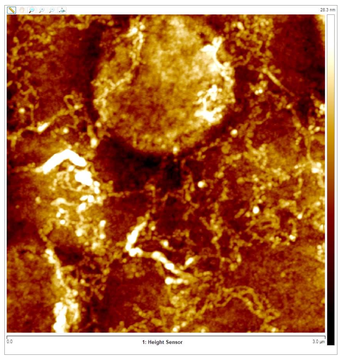


- **CSA-based sensors demonstrate high reversibility and repeatability.**

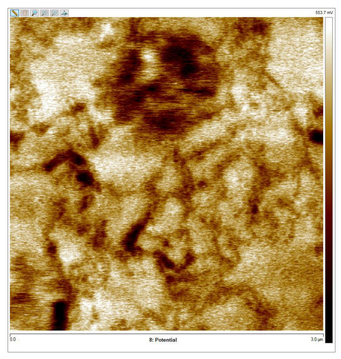
Peak force AFM measurements

- **Topography, electric potential and mechanical properties of the composite PAni:CSA-PU layers**
- **Understanding of the layer structure as a function of the PU concentration.**

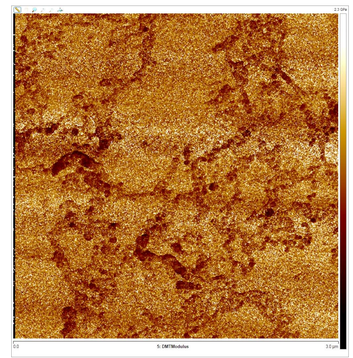




Topography (3x3µm)



Surface potential (3x3µm)



DMT Modulus (3x3µm)

- The PeakForce technique allows high spatial resolution characterization of composite materials such as PAni:CSA-PU . The correlation between topography, surface potential, and mechanical properties offers a unique and powerful tool to analyse the thin film local composition and properties

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