ADVANCED NANO-ELECTRICAL CHARACTERIZATION OF BIDIMENSIONAL MATERIALS AND SOLAR CELLS WITH ATOMIC FORCE MICROCOPY.

Nicolas F. Martinez[1] and *Louis Pacheco[1]

[1]Concept Scientific Instruments, 2 Rue de la Terre de Feu, 91940 Les Ulis, France

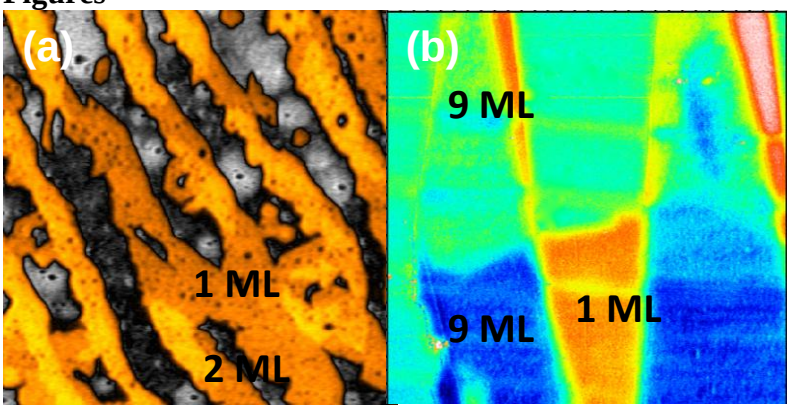
*email corresponding author: l.pacheco@csinstruments.eu

Abstract

Over the past 30 years, Atomic Force Microscopy has evolved from a microscope to measure just the surface topography to a wide variety of measurement modes that provides a way to characterize other atomic interactions or physical properties like magnetic field, electric field, nanoscale dissipation processes, thermal conductivity, electrical conductivity, resistance, surface potential, piezoresponse, Young modulus,… Electrical nanocharacterization with AFM has emerged as a powerful tool to map electrical properties at the nanoscale, like surface potential (work function) and conductivity. However, traditional setups in AFM make difficult to obtain accurate and repeteable results over several types of samples.

In this contribution we will show the capabilities new developed AFM modes: High Definition Kelvin Force Microscopy (HD-KFM), ResiScope, Soft-Resiscope and Scaning Microwave that overcome the intrinsic difficulties of electrical nanocharacterization with AFM. This two techniques have been applied on a wide variety of substrates: bidimensional materials, like graphene or molibdene disulfide, organic solar cells or nanoparticles providing high stability, sensitivity and lateral resolution.

Figures



a) HD-KFM image on Graphene b) HD-KFM image on Molibdene disulfide

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