LONG RANGE SCANNING PROBE MICROSCOPY APPLICATIONS IN LOCAL MECHANICAL ANALYSIS

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Abstract

With the rise of nanotechnology and nanofabrication, local mechanical properties determined with microscale and nanoscale resolution are becoming more and more important. Even if the scanning probe microscopy based methods are providing excellent spatial resolution their ability to provide quantitative results of local mechanical properties (e.g. Young modulus) are still very limited. Therefore specialized techniques need to be used if we want to reach better accuracy, like nanoindentation, microindentation or microscratch. Scanning probe microscopy can however serve also to these techniques - providing very accurate measurements of surface topography after mechanical testing.

The surface topography can then be directly used for data interpretation.

In this contribution we present results of application of a special variant of a scanning probe microscope - long range SPM - in mechanical properties data interpretation. Long range SPM overcomes the limitations of commercial SPMs by scanning range larger by several orders which is, as we show, crucial for analysis of surface morphology after different local mechanical properties techniques use.

Keywords: Long range SPM, indentation, scratch, Young modulus

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