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Characterisation of Carbon Nano-Materials with the Confocal Raman AFM KLAUS WEISHAUPT, JIANGYONG YANG, THOMAS DIEING, UTE SCHMIDT, WITec GmbH, Ulm, Germany — Carbon is known to exist in a number of allotropes which range from single crystalline diamond - the hardest of all known materials, to the soft, mainly amorphous graphite. The recently discovered carbon nano- materials such as nanotubes and graphene gain more attention in the field of material science due to their light weight, unique electrical and optical properties and mechanical strength. The implementation of such carbon nano-materials into electrical devices or as fillers in polymeric matrixes requires characterization techniques suited for the nanometer range. Due to the unique optical properties of carbon nano-materials, Raman microscopy can be used to characterize single walled carbon nanotubes (SWCNT) with a diameter far below the optical resolution limit in the nano-meter range. Furthermore, the distribution of such nanotubes in polymeric matrixes can be visualized structurally as well as chemometrically. Raman spectroscopy is a well-suited tool to characterize graphene with its unique optical properties, similar to those of CNTs, as a two-dimensional model system. The correlation of spectral data with the number of grapheme layers can be achieved by combining Raman microscopy with AFM.

Ute Schmidt
WITec GmbH, Ulm, Germany

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