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JPK reports on the use of the NanoWizard® AFM system at Swansea University to study the structural, chemical, optical and electronic properties of materials on the nanoscale.

Berlin, July 15th, 2014: JPK Instruments, a world-leading manufacturer of nanoanalytic instrumentation for research in life sciences and soft matter, reports on the use of their AFM system, the NanoWizard® in the Physics Department at Swansea University.

Dr Peter Dunstan is an associate Professor in the Department of Physics at Swansea University and a member of the University's Centre for Nanohealth. His research utilizes state of the art techniques and instrumentation to increase the fundamental understanding of the structural, chemical, optical and electronic properties of materials on the nanoscale, and by doing so advance the future application of those materials. This includes a broad platform of sample types including novel single crystal nanostructures to applications in soft matter, such as used in cell diagnostics.

Asked why AFM is an important technique in his research, Dr Dunstan said "AFM based systems give us the opportunity of generating a clear understanding of the structure of the materials that we investigate. AFM can also offer us the opportunity to correlate this structural measurement with other characteristics. For instance, by coating an AFM probe with gold and utilising the interaction between the metallised tip and a sample, it allows us to exploit an optical antenna effect when the tip is illuminated by an externally focussed laser of a suitable wavelength. This arrangement allows us to simultaneously correlate an enhanced localised spectroscopic response from the sample, along with the normal AFM response, and in doing so advance the application of the AFM instrument in line with our research objectives."

Having developed in-house instrumentation and used a wide variety of commercial scanning probe techniques including STM, AFM and SNOM for both research and teaching, Dr Dunstan is well placed to comment on the advantages he sees in the NanoWizard® system. "One major aspect of the benefits of using JPK has been their ability to embrace our own research innovations and hence allow us to integrate our technology advances into the JPK instrument. This has allowed us to retain the advances we have made and integrate them onto the stable JPK AFM platform for improved performance. Also partnership with other companies has been important and is an area

where JPK showed tremendous willing for cross-platform integration (for example with AFM/optics/spectroscopy based research and with the company Renishaw PLC). Most recently, we published a paper in the *Journal of Raman Spectroscopy* on the use of TERS, tip-enhanced Raman spectroscopy, where we combined our JPK AFM and Renishaw Raman spectrometer to enhance lattice defect signatures in graphene. ¹.”

“It is important to mention we have benefited from the keen commitment of JPK staff to help us develop specialised adapted software approaches for our instrument when performing tip-enhanced spectroscopies and this has allowed us the precise control in the acquisition parameters that we require.”

For more details about JPK’s NanoWizard® AFM systems and applications for the bio & nano sciences, please contact JPK on +49 30533112070, visit the web site: www.jpk.com or see more on Facebook: www.jpk.com/facebook and on You Tube: <http://www.youtube.com/jpkinstruments>.

Reference

- 1) Enhancement of lattice defect signatures in graphene and ultrathin graphite using tip-enhanced Raman spectroscopy, R H Rickman & P R Dunstan, [DOI: 10.1002/jrs.4416](https://doi.org/10.1002/jrs.4416)

Attachment:



Dr Peter Dunstan (left) together with two members of his research group; PhD students, Katie Welsby and Adam Williams.

For a high resolution copy of the image, either right click to download, or contact Jezz Leckenby at Talking Science.

About JPK Instruments

JPK Instruments AG is a world-leading manufacturer of nanoanalytic instruments - particularly atomic force microscope (AFM) systems and optical tweezers - for a broad range of applications reaching from soft matter physics to nano-optics, from surface chemistry to cell and molecular biology. From its earliest days applying atomic force microscope (AFM) technology, JPK has recognized the opportunities provided by nanotechnology for transforming life sciences and soft matter research. This focus has driven JPK's success in uniting the worlds of nanotechnology tools and life science applications by offering cutting-edge technology and unique applications expertise. Headquartered in Berlin and with direct operations in Dresden, Cambridge (UK), Singapore, Tokyo, Shanghai (China) and Paris (France), JPK maintains a global network of distributors and support centers and provides on the spot applications and service support to an ever-growing community of researchers.

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