JPK Instruments Nanotechnology for Life Science

JPK announces the ForceRobot®300 system for single molecule force spectroscopy studies

Berlin, 10th November 2009 – JPK Instruments, a world-leading manufacturer of nanoanalytic instrumentation for research in life sciences and soft matter, is happy to announce the latest member of their nanotechnology characterization systems family: the ForceRobot®300, the new standard in single molecule force spectroscopy.

Force spectroscopy is a single molecule technique that allows the real-time study of molecular interactions on the nanoscale. Originating from the broad field of Atomic Force Microscopy (AFM), force spectroscopy directly addresses the measurement of forces between and within molecules. The sensitivity is high enough to characterize molecular interactions such as the unfolding forces of single proteins or forces of a single molecular bond.

The key to obtaining meaningful results from single molecule techniques such as force spectroscopy is the statistical management of the results. This is where the new ForceRobot®300 technology delivers the solution. The automated setup and continuous adjustments provide improvements in the efficiency of data collection while the integration of optical techniques allows targeted measurements where the molecules of interest are located. These factors, combined with the highest data quality and stability, open the field of single molecule force spectroscopy to a new level of results.

Until now, single molecule force spectroscopy was a complicated procedure. The requirement of frequent manual calibrations and alignments as well as the need for constant operator presence with the instrument made it a long-winded task. Useful data output was both low and slow with only a few suitable curves obtained over many hours. The ForceRobot®300 addresses these issues as a dedicated tool for the force spectroscopist.

The key to the system is the incorporation of intelligent software for experimental design, data acquisition and evaluation. Tens of thousands of force curves may be generated and evaluated in a matter of hours. To produce high quality curves requires an exceptional instrument with the lowest noise floor and the most rigid mechanical design. The highest accuracy and stability of the instrument is ensured by integrated capacitive position sensors with drift being minimized thorough utilizing a symmetrical system design.

The system may be operated in a stand-alone mode (see photograph) to give maximum access and flexibility to the sample. Alternatively, it may be mounted on top of an inverted optical microscope to enable simultaneous force spectroscopy and fluorescence microscopy. Both versions are available with a choice of positioning stage. While the basic motorized stage will provide positioning to better than one micron, the Precision Mapping Stage uses closed-loop control with noise levels to better than 0.3nm with positioning to about 1nm.

Like all JPK's advanced instruments, the ForceRobot®300 has many further options for fluidics and temperature control to enable the most reproducible results. To learn more, visit the JPK website to download a brochure and read about various applications.

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About JPK Instruments AG

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. JPK was recognized as Germany's fastest growing nanotechnology company in 2007 and 2008 (Deloitte). 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 and Tokyo, 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.

The JPK Force Robot®300 system