Scientists at CENIMAT and the Materials Science Department, New University of Lisbon, are investigating LCP polymer blends using the Linkam CSS450

Tadworth, UK- 15th May 2013: *Market leaders in temperature controlled microscopy, Linkam Scientific Instruments report on the use of their popular CSS450 stage for polymer research at the New University of Lisbon, Portugal.*

Liquid-crystalline polymers (LCPs) are materials with exceptionally useful mechanical properties compared with ordinary industrial polymers. LCPs are not frequently used in industry due to their prohibitive production costs, but blending an LCP with a relatively common polymer is one way to utilize them at a reduced cost. Only blends that fibrillate in situ during processing, and when the fibrils maintain a solid state, do they demonstrate these superior properties.

Associated with the Department of Materials Science, University of Lisbon, CENIMAT (a national scientific research centre in Portugal) is devoted to developing radical new approaches in the areas of structural, electronic and optoelectronic, polymeric and mesomorphic, dielectric and electroactive materials. Professor Maria Teresa Cidade and her colleagues are looking at the fibrillation mechanisms within two blends of polyethylene terephthalate (PET) with a liquid crystalline polymer, Rodrun LC3000 (10 and 25 wt % LCP content). PET is often used within consumable packaging. The scientists' initial studies of the blends using a scanning electron microscope (SEM) showed that the 10wt% blend had no fibrils, yet the 25wt% blend did have some evidence of fibrillation. To better understand the mechanical behaviour of the polymer blends, the scientists used the Linkam CSS450 stage to study the rheo-optical properties.

Professor Cidade commented "the Linkam CSS 450 Shearing System allows us to follow the morphology/texture of different kind of fluids such as liquid crystals, emulsions and composites." Using the CSS450, the structural dynamics of complex fluids can be directly observed using a standard optical microscope while under precisely controlled temperature and shear modes. The microstructure evolution of complex fluids can be studied in great detail for many physical processes. This allows the correlation of the micro structural dynamics with rheological data to gain insight into the rheology of complex fluids. The images captured can also be used to validate numerical results from computer simulations and experimental data from indirect measurements such as using scattering techniques.

Samples were observed for droplet size and deformation under varying shear rates It was shown that the blend with the lower LCP content had minimal relaxation times which did not increase exponentially for higher shear rates. The blend with the higher LCP content showed increasing relaxation times in parallel with the increase of shear rate. Professor Cidade explained, "We found that the droplet shape relaxation time (the time the deformed droplet takes to regain its spherical form after cessation of flow) allowed for the explanation of the morphological observations."

www.linkam.co.uk

University of Arkansas Selects Bruker Universal Mechanical Tester

Bruker's Nano Surfaces division announced that they have shipped the first unit of the newly redesigned Universal Mechanical Tester (UMT) to the Nano Mechanics and Tribology Laboratory (NMTL) at the University of Arkansas. The new instrument, launched at the 2012 Materials Research Society (MRS) Fall Meeting, is designed with a wide range of interchangeable drives and fixtures that allow samples to be tested under multiple wear patterns. The next-generation UMT now also incorporates a reliable optical profiler from Bruker that can rapidly and accurately measure surfaces before and after tribology or mechanical testing. Advanced servo control and patented force sensor designs allow these enhancements to be achieved without compromising UMT's industry-leading accuracy and repeatability, further enhancing the platforms reputation as the world's most versatile mechanical tester.

"The UMT is likely to be a very useful tool for us in our research," said Dr. Min Zou, Director of the Nano Mechanics and Tribology Laboratory (NMTL) at the University of Arkansas. "The universal nature of the tool is ideal for us as we can conduct many different tests without having to purchase several tools for our lab. The new design seems very easy to work with and we are looking forward to the useful data that we can generate."

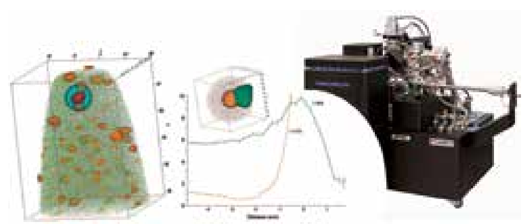
"The new UMT tool enables users to change the configuration in minutes, moving between different reciprocating or rotary friction and wear test setups, or even into scratch and indent test modes for material characterization," said James Earle, General Manager of Bruker's Tribology and Mechanical Testing Business. "We are pleased that the University of Arkansas has chosen UMT to advance their tribology and mechanical testing capabilities, and are delighted that the system will be in a situation that will fully utilize its flexibility for both cutting-edge research and the education of the next generation of mechanical engineers."

www.bruker.com

Acutance Scientific announces new version of acclaimed CAMECA® IVAS™ software for 3D Atom Probe Tomography

CAMECA® has launched a new version of IVAS™ (Integrated Visualization and Analysis Software). IVAS is an easy-to-use software application that provides powerful data visualization and analysis capabilities tailored to the needs of anyone using Atom Probe Tomography (APT). IVAS™ offers unique 1D, 2D and 3D display capabilities, a wide range of advanced analysis functions and extensive export options, all within a tightly integrated Windows™ environment.

In addition, a limited, no-cost version of the software, IVAS LT™ is also now available to all CAMECA LEAP® system owners, allowing them to finish data analysis and optimize images for their presentations and manuscripts.



Created in just a few clicks in IVAS, isosurfaces identify major phases and precipitates.

On the pictured example, copper in steel precipitates are sorted by volume and IVAS automatically computes a proxigram based on one or more interfaces. Composition measured in respect to one or more 3D surfaces gives unmatched sensitivity to segregation between phases and grains.

Here, voxel size and shape, ion delocalization (smoothing) and thresholding of isosurfaces are freely adjustable.

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