Friday, October 1, 2021

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Raman Imaging for the Complete Polymer Lifecycle: From Materials Science to Environmental Impact

Thursday, October 14, 2021 10:00 AM - 11:00 AM EDT

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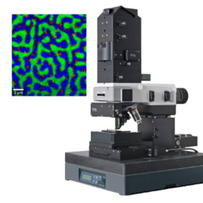
.: About This Webinar



Polymers are omnipresent in contemporary products such as coatings and packaging. They begin as chemical formulations optimized for specific functions, are produced at-scale while being checked for consistency, fulfill their intended purpose, and are subsequently discarded. This presentation will describe and demonstrate the advantages that Raman imaging microscopy offers for analyses of polymers at every stage of the product lifecycle.

A nondestructive and label-free technique, Raman microscopy is based on detecting shifts in the energy of light inelastically scattered by molecules. These shifts are visible in Raman spectra that serve as unique "fingerprints" for chemical identification. In the case of polymers, Raman can provide detailed insight into chemical properties, both by characterizing the distribution of sample components — in 3D — and by looking at polymerization processes over time. Raman imaging can also be used to find, quantify, and identify large numbers of polymer microparticles in environmental samples.

The webinar will begin with a brief overview of the operational principles and hardware considerations for Raman microscopy and will then cover variations of the method, including:

- **Confocal Raman imaging**, in which Raman spectra are acquired from every measurement point to visualize material distribution in 3D.
- **Raman-based automated particle analysis**, intended to greatly accelerate workflows for studying microplastics.
- **Correlative Raman microscopy**, which integrates other methods such as atomic force microscopy (AFM) to yield comprehensive data from samples.

These forms of Raman imaging microscopy will be shown performing analyses of polymers in various fields of application and during different phases of the product lifecycle, from initial development to production, through quality control, use, and ultimately disposal. The webinar will conclude with an open Q&A.

Pictured: An example of a Raman microscope (right) and the type of image it can produce for chemical polymer analysis (upper left). Courtesy of WITec GmbH.

Who should attend:
This webinar will be of interest to Raman newcomers as well as experienced spectroscopists working with polymers. This includes R&D scientists and engineers, manufacturers, and T&M specialists involved in the design or production of coatings and other polymer materials for optical imaging.

About the presenter:
Nour Hafi, Ph.D., is an application scientist at WITec GmbH with wide-ranging expertise in Raman imaging, AFM, and scanning near-field optical microscopy (SNOM). He devises related scientific solutions and responds to research questions and requirements from clients and customers. In doing so he develops technical and experimental configurations in cooperation with the R&D department and product manager. Hafi received his master's and Ph.D. degrees in biophysical chemistry from the Technical University of Braunschweig, Germany. He then worked for one year as a postdoctoral researcher at the Max Plank Institute for Biophysical Chemistry in Göttingen. While pursuing his Ph.D. he focused on high-resolution light microscopy using polarization modulation techniques. He is also experienced with multiphoton imaging, nonlinear spectroscopy, and many other imaging and spectroscopic techniques.

About WITec GmbH:
WITec GmbH pioneered 3D Raman imaging and correlative microscopy and continues to lead the industry with a product portfolio that offers speed, sensitivity, and resolution without compromise. Raman microscopes, AFMs, SNOMs, or select combinations thereof, along with WITec-developed Raman-SEM (RISE) instruments can be configured for specific challenges in chemical and structural characterization through WITec's modular, expandable hardware and software architecture. From its headquarters in Ulm, Germany, WITec has an established presence in every global region.

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