

In-situ nanomechanical testing of micro-capsules: from strength to surface energy and fatigue

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In this seminar, an overview will be given on the most recent advances of micro and nano-scale characterisation methods for the assessment of mechanical properties and microstructure of polymeric micro-capsules.

After an introduction to the basics of Focused Ion Beam (FIB) microscopy and nanoindentation testing, some advanced examples will be shown to demonstrate how the combination of these two methods can allow scientists to get further insights into the microstructure/property correlations and the scale-effects in mechanical behaviour of nanostructured materials.

In the second part of the seminar, the focus will be on the application of advanced in-situ nanomechanical testing for advanced characterisation of micro-capsules. Here, we will show innovative methods to measure the surface energy and the behaviour under cyclic loading of micro-capsules.

The results will demonstrate how nanomechanical testing can be a unique tool for the understanding of the existing complex interactions among surface chemistry, wall thickness and surface nano-roughness on the adhesive and mechanical dynamical properties of such materials. A correlation between the nano-mechanical properties and the in-service behaviour will be given as well.