Nanomechanical IR Spectroscopy for the fast analysis of picogram samples of engineered nanomaterials - DTU Orbit (01/01/2019)

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The proliferation of engineered nanomaterials (ENMs), e.g. in nanomedicine, demands for novel sensitive techniques allowing for the analysis of minute samples. We present nanoelectromechanical system-based IR spectroscopy (NEMS-IR) of picograms of polymeric micelles. The micelles are nebulized with electrospray directly from dispersion and then efficiently collected on the sensor, which detects the IR-wavelength-dependent photothermal sample heating. Only 10 nL of sample (∼0.1 mg/mL) is required for the acquisition of an IR spectrum. Measurement, including sample preparation, takes only a few minutes, compared to 2 days for analysis by ATR-FT-IR. NEMS-IR constitutes a promising technique for the fast analysis of ENMs.

General information
State: Published
Organisations: Department of Micro- and Nanotechnology, Nanoprobes, Colloids and Biological Interfaces
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Number of pages: 2
Pages: 2552-2553
Publication date: 2014

Host publication information
Title of host publication: Proceedings of the 18th International Conference on Miniaturized Systems for Chemistry and Life Sciences
Keywords: NEMS-IR, Engineered nanoparticles, Nanomedicine, Infrared spectroscopy
Source: PublicationPreSubmission
Source-ID: 103564660
Research output: Research - peer-review » Conference abstract in proceedings – Annual report year: 2014