AFM-based infrared spectroscopy—nanoscale chemical analysis with sub-monolayer sensitivity

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This talk will focus on techniques and instrumentation for measuring chemical and optical properties of materials with nanometer scale spatial resolution. Conventional infrared spectroscopy is one of the most widely used tools for chemical analysis, but optical diffraction limits its spatial resolution to the scale of many microns. Atomic force microscopy (AFM) enjoys excellent spatial resolution, but has historically lacked the ability to perform robust chemical analysis. This presentation will discuss two techniques (1) AFM-based infrared spectroscopy and (2) scattering scanning near field optical microscopy (s-SNOM). Both of these techniques overcome the diffraction limit, providing the ability to measure and map chemical and optical properties with nanometer scale spatial resolution. As complementary techniques, AFM-IR and s-SNOM together provide an unrivaled capability to perform nanoscale chemical analysis on a diverse range of organic, inorganic, photonic and electronic materials. This talk will show AFM and s-SNOM applications on samples from fields including polymers, life sciences, semiconductors, graphene and nanoantennas.