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Broadband vibrational nano-spectroscopy with a synchrotron infrared source[1] HANS A. BECHTEL, Lawrence Berkeley National Laboratory, ROBERT L. OLMON, ERIC A. MULLER, BENJAMIN POLLARD, MARKUS B. RASCHKE, University of Colorado, Boulder, MICHAEL C. MARTIN, Lawrence Berkeley National Laboratory — Scattering-scanning near-field optical microscopy (s-SNOM) is capable of providing chemical contrast with deep sub-wavelength spatial resolution of a few 10's of nanometers. Unfortunately, the wide applicability of the technique has been hindered by the lack of suitable broadly-tunable or broadband IR sources that can provide the necessary high spectral irradiance. Here, we demonstrate broadband, Fourier-transform infrared spectroscopic s-SNOM using infrared synchrotron radiation from the Advanced Light Source (ALS). We show near-field spectra spanning the full mid-infrared, including the fingerprint absorption region (700 cm^{-1} — 4000 cm^{-1}) and spectroscopic multi-modal imaging in combination with laser-based IR sources. We discuss the potential of the approach for a wide range of soft and hard matter nanoscale spectroscopic applications.

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