

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Phonon resonant spectroscopic recognition of 4 nm silicon nitride particles by infrared near field microscopy YOHANNES ABATE, California State University, Long Beach, JOHANNES STIEGLER, Nanooptics Laboratory, CIC nanoGUNE, YAROSLAV ROMANYUK, Chemical Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, ANDY HUBER, 1 Nano-Photonics Group, Max-Planck-Institut für Biochemie, 82152 Martinsried and Center for NanoScience (CeNS), Munich, Germany, STEPHEN LEONE, Departments of Chemistry and Physics, University of California, Berkeley, CA, RAINER HILLENBRAND, Photonics Group, Max-Planck-Institut für Biochemie, Nanooptics Laboratory, CIC nanoGUNE, 20018 Donostia - San Sebastián, Spain — Silicon nitride polar dielectric nanoparticles, grown by high-temperature high vacuum reaction of Si(100) with a nitrogen plasma, are imaged using optical near-field microscopy in the infrared. Phonon resonant particles as small as 4 nm in size are detected, indicating a spatial resolution of $\sim \lambda/700$, where λ is the wavelength of light. Locally excited silicon nitride phonon polariton resonances occur around 934 cm^{-1} and increase in intensity with the size of the nanoparticles. Experimental results are in very good agreement with dielectric function model calculations for thin films in the extended dipole approximation.

Yohannes Abate
California State University, Long Beach

Date submitted: 17 Dec 2009

Electronic form version 1.4