Abstract Submitted
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Determination of the dielectric function of materials with scattering-type scanning near field optical microscopy[1] PENG XU, T.J. HUFFMAN, M.M. QAZILBASH, College of William and Mary, INHAE KWAK, AMLAN BISWAS, University of Florida — Apertureless scattering-type near field optical and infrared microscopy has been widely employed for imaging a variety of systems at the nanoscale including semiconductor nanostructures, organic biosystems, and phase coexistence during metal-insulator transitions. In apertureless, scattering-type near field infrared microscopy, one can measure both the near field amplitude and phase. To obtain the complex dielectric function of the material at nanometer length scales from the measured amplitude and phase, the inverse problem of near field interaction needs to be solved. We employed the lightning rod model [1] to analyze the near field interaction and obtain the dielectric function numerically. We present results for near-field infrared measurements on transition metal oxides including those that exhibit optical contrast due to coexisting phases. [1] A. S. McLeod et al. , Phys. Rev. B 90, 085136 (2014)

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Peng Xu
College of William and Mary

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