Abstract Submitted
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Enhanced optical absorption and Raman scattering in carbon nanostructures[1] DINKO CHAKAROV, HANS FREDRIKSSON, Department of Applied Physics, Chalmers University of Technology, SE-41296 Gothenburg, Sweden, JUAN CARDENAS, Department of Chemistry, University of Oslo, 0315 Oslo, Norway, TAVAKOL PAKIZEH, MIKAEL KALL, Department of Applied Physics, Chalmers University of Technology, SE-41296 Gothenburg, Sweden — Hole-mask colloidal lithography and oxygen reactive ion etching is used to fabricate supported graphite and amorphous carbon nanostructures with well-defined diameters ranging from ∼100 to 350 nm and heights from ∼50 to 200 nm. Optical absorption/extinction spectra, as well as finite difference time domain (FDTD) calculations, reveal resonant absorption in the visible. The spectral maxima are correlated to nanostructures size and shape. While the nanostructures preserve the source material morphology, clear enhancement of the Raman scattering intensity, correlated to the resonant absorption is observed. Upon increasing the laser power, distinct peak-splits and –shifts, and increasing anti-Stokes signal intensity, suggest selective heating of the nanostructures. These correlations have been used to follow the oxidation of amorphous carbon nanostructures and to propose relevant model for investigations of soot oxidation.

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