

Monitoring the Photothermal Reshaping of Individual Plasmonic Nanorods with Coherent Mechanical Oscillations

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RESUMEN

Light absorption in gold nanoparticles leads to the metal heating that induces photothermal reshaping due to atomic surface diffusion at temperatures well-below the gold melting point. In this work, we perform time-resolved experiments to measure the frequencies of the extensional coherent mechanical mode in single gold nanorods, as a monitor of the changes in their aspect ratio produced by this photoinduced reshape. We show that photothermal reshaping is always present in typical pump-probe experiments conducted in air even at low excitation light irradiances and usually long measuring times. Reshaping effect can be reduced by a polymer coating, which allows faster heat dissipation from the nanoparticle to the environment.

Key words: UTN; FRD; gold nanoparticles ; photothermal reshaping