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Nonlinear Raman Effects Enhanced by Surface Plasmon Excitation in Planar Refractory Nanoantennas

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Abstract

© 2017 American Chemical Society. We consider a nonlinear mechanism of localized light inelastic scattering within nanopatterned plasmonic and Raman-active titanium nitride (TiN) thin films exposed to continuous-wave (cw) modest-power laser light. Owing to the strong third-order nonlinear interaction between optically excited broadband surface plasmons and localized Stokes and anti-Stokes waves, both stimulated and inverse Raman effects can be observed. We provide experimental evidence for coherent amplification of the localized Raman signals using a planar square-shaped refractory antenna.

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Keywords

inverse Raman effect, Nonlinear refractory plasmonics, planar antenna, stimulated Raman scattering, tip-enhanced Raman scattering, titanium nitride

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