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35 - Plasmon-Enhanced Stimulated Raman Spectroscopy with Low-Power CW Lasers

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We present a successful combination of stimulated Raman spectroscopy (SRS) and surface-enhanced Raman scattering (SERS) using low-power cw laser sources and gold/silica nano-particles with embedded reporter molecules. We demonstrate that cw surface-enhanced stimulated Raman spectroscopy (cwSESRS) can be used to detect a Raman signal in samples with pico-molar or low nano-molar concentrations via a nano-particle enhancement. We report the preparation method for samples and illustrate how Raman spectra generated from our experiment matches the conventional Raman spectra of these samples. We also investigate the effect of source power, polarization and sample concentration on the cwSESRS signal. The realization of cwSESRS with low-cost cw sources, and pump and Stokes powers as low as 34 mW and 440 mW, leads to opportunities for a wider range of Raman spectroscopy applications especially in clinical research.

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