

High-resolution narrowband CARS spectroscopy in the spectral fingerprint region

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We demonstrate high-resolution narrow-band coherent anti-Stokes Raman scattering (CARS) spectroscopy covering a large part of the molecular fingerprint region. We designed and built an optical parametric oscillator (OPO), with a novel variable output coupler, to use as a tunable light source for this purpose. The OPO has a wide tuning range and is capable of scanning $150 \text{ cm}^{-1}/\text{min}$ on average, with a resolution down to 0.4 cm^{-1} . The experimental setup allows either the idler or a 1064 nm beam to be used as the Stokes beam, to address a different spectral region. By combining these scans, we obtain for the first time a continuous CARS spectrum from 900 to 3600 cm^{-1} , which we compare to a Raman spectrum using a phase retrieval algorithm.