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**We** demonstrate high resolution ( $1 \text{ cm}^{-1}$ ) coherent anti-Stokes Raman spectroscopy and microscopy around  $3000 \text{ cm}^{-1}$  by combining a broadband shaped pulse (pump and probe) with a narrowband Stokes pulse. We show spectroscopy based on sweeping a  $\pi$ -phase step through the spectrum (around  $800\text{nm}$ ) of our broadband pulse and recording a CARS spectrum for each position of the step. By subtracting the spectra for a positive and a negative phase step the purely non-resonant part of the background is removed. Furthermore we show chemically selective imaging using stepped phase profiles. By changing the location of the phase step, the signal from either PS or PMMA can be suppressed.

