Supplementary Materials for: A Fourier transform Raman spectrometer with visible laser excitation

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Fig. S1. Raman spectrum of sulfur powder (excited at 532 nm) measured with the FT-Raman spectrometer (a) at 77 mW laser power (6 second acquisition) and the CCD based dispersive spectrometer (a) at 0.1 mW laser power (60 seconds acquisition). Note that the spectrum is cut around 100 cm\(^{-1}\) for the dispersive spectrometer and that the FT-Raman spectrum has a much larger signal-to-noise ratio.

In Fig. S1., we show the Raman spectra of sulfur for the FT-Raman and CCD based dispersive spectrometers when excited at 532 nm with different laser powers. The laser power densities are about 10 W/cm\(^2\) and 10\(^4\) W/cm\(^2\) for the FT and dispersive spectrometers. This large difference in the laser power densities stems from the laser spot diameters of about 1 mm and 1 \(\mu\)m, respectively. As a result, the dispersive spectrometer operates with three orders of magnitude larger laser power density on the sample for the given values. However, the FT-Raman spectra has a much better signal-to-noise ratio of about 600 as compared to 15 for the dispersive one, when both data are normalized to 1 second acquisition time. This means that the FT-Raman outperforms the CCD based dispersive spectrometer by several orders of magnitude when the laser power density is taken into account.

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