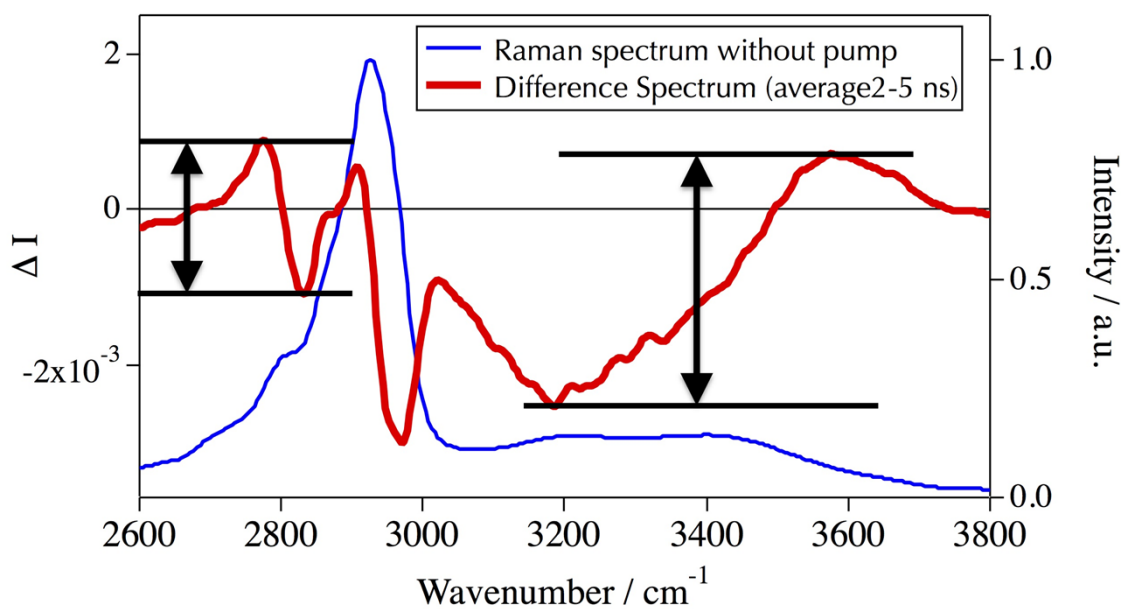
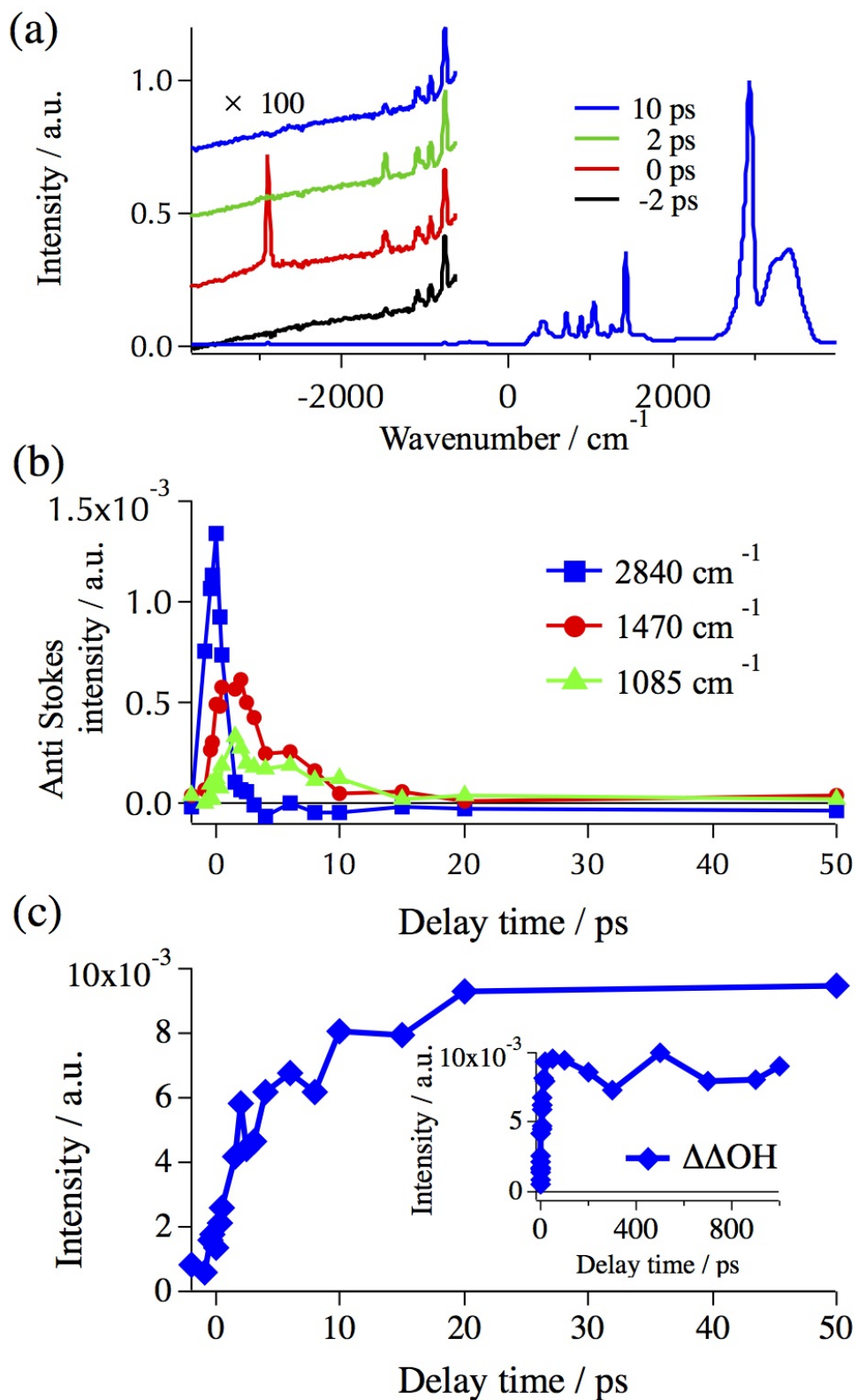


Supporting Information



SI.1 Definition of $\Delta\Delta I$. Based on the averaged difference spectrum (2-5 ns), we determined the peak position of differential shaped peak. For the methylene CH region, the peak intensity at 2775 cm⁻¹ (positive) and 2828 cm⁻¹ (negative) were adopted and the $\Delta\Delta I$ value was calculated for each delay time.



S2. Raman spectra of TEA-water mixture (critical composition) at several delay times (a), time evolution of anti-Stokes intensity (b), and $\Delta\Delta\text{I}$ at the OH stretching region (c) after the CH stretching pumping at 2840 cm^{-1} .