

Supplementary Information

Example ^1H NMR spectra and peak assignment for each carbonyl compound. The carbonyl- H_2O_2 mixtures at equilibrium are shown.

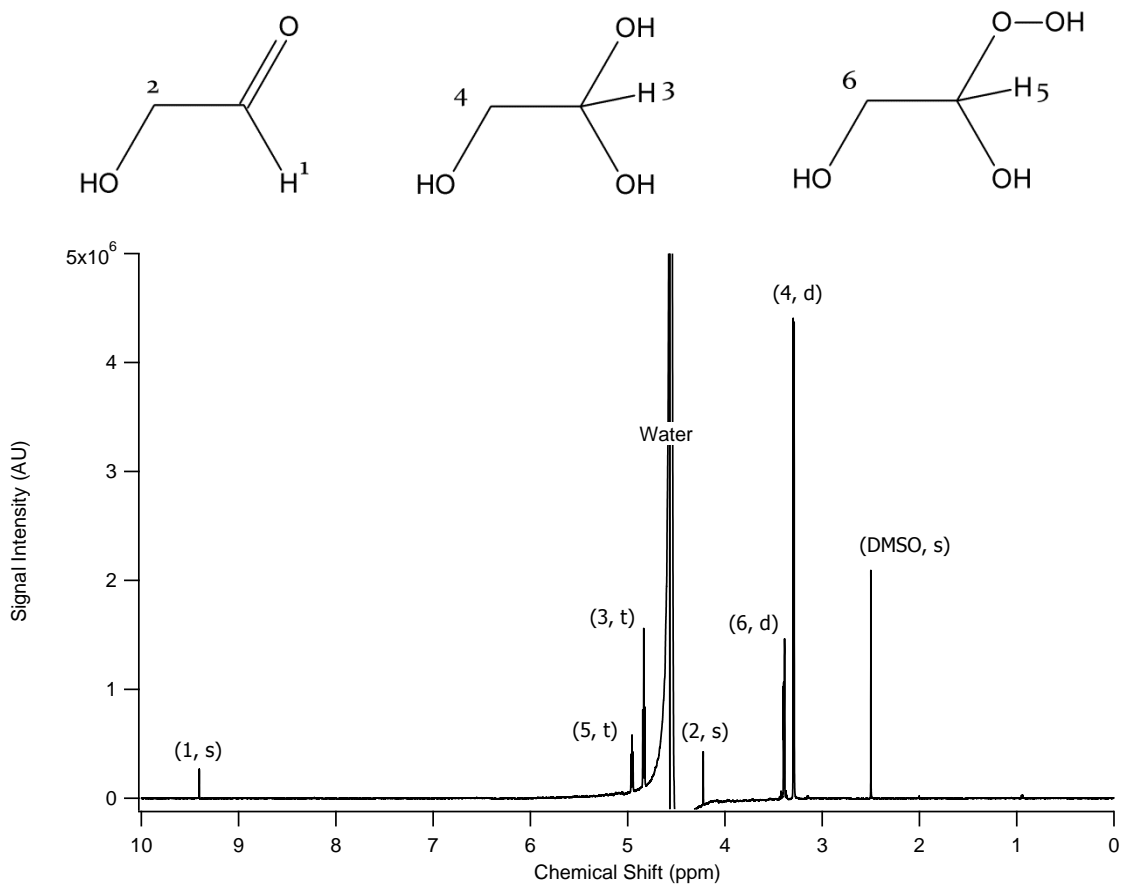


Figure S1. Glycolaldehyde (10 mM) and H_2O_2 (17.7 mM)

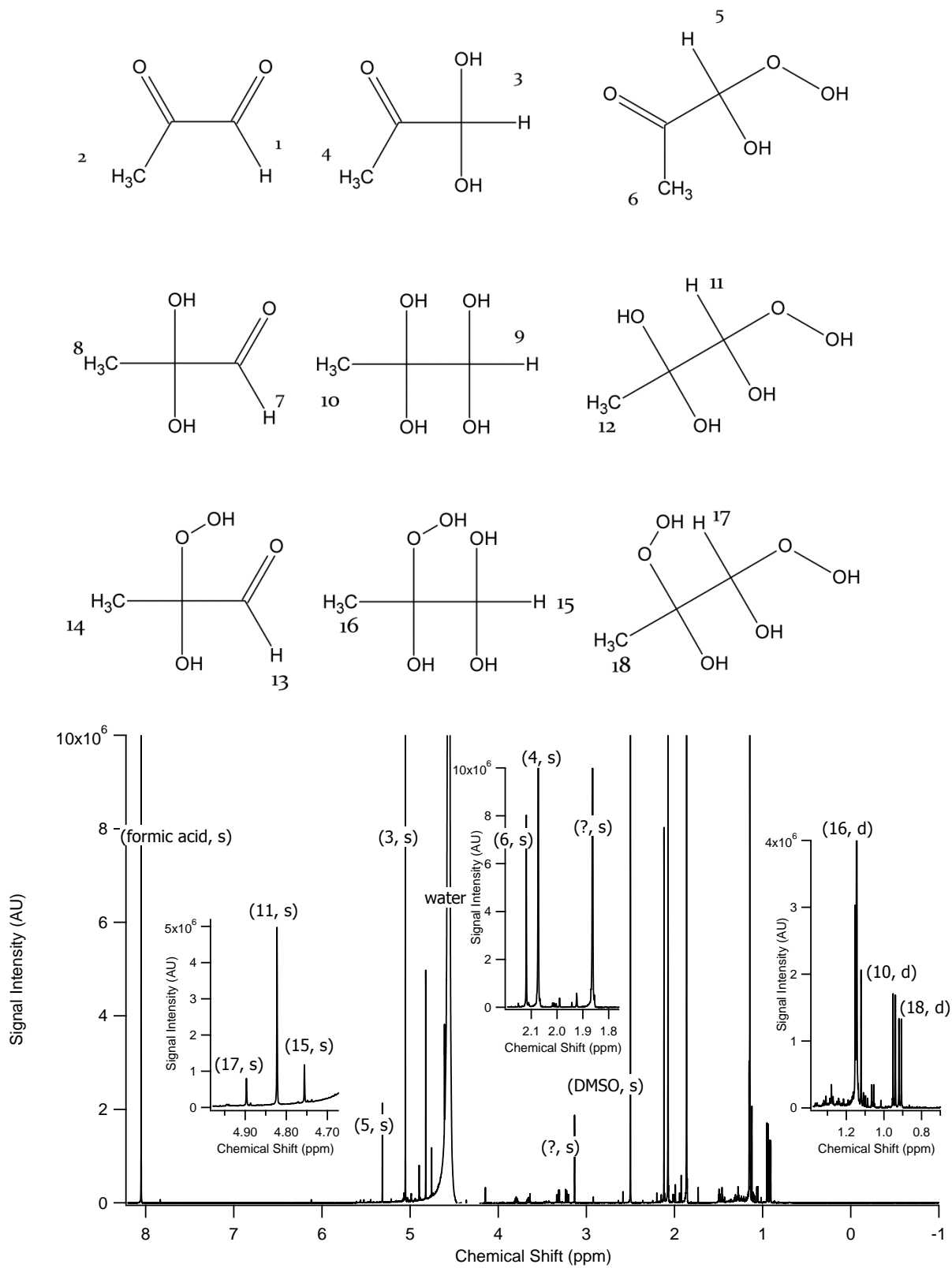


Figure S2. Methylglyoxal (10 mM) and H₂O₂ (17.7 mM)

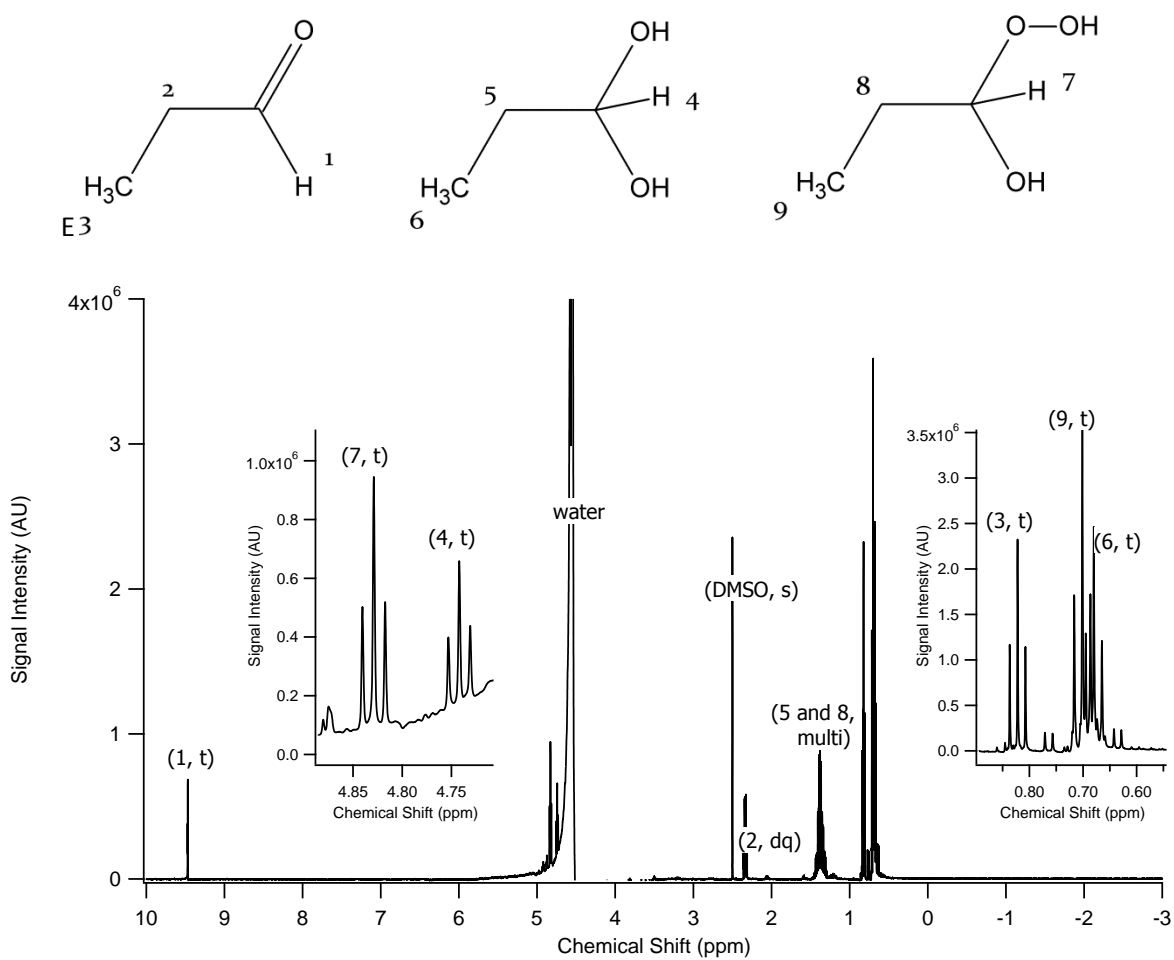


Figure S3. Propionaldehyde (10 mM) and H_2O_2 (17.7 mM)

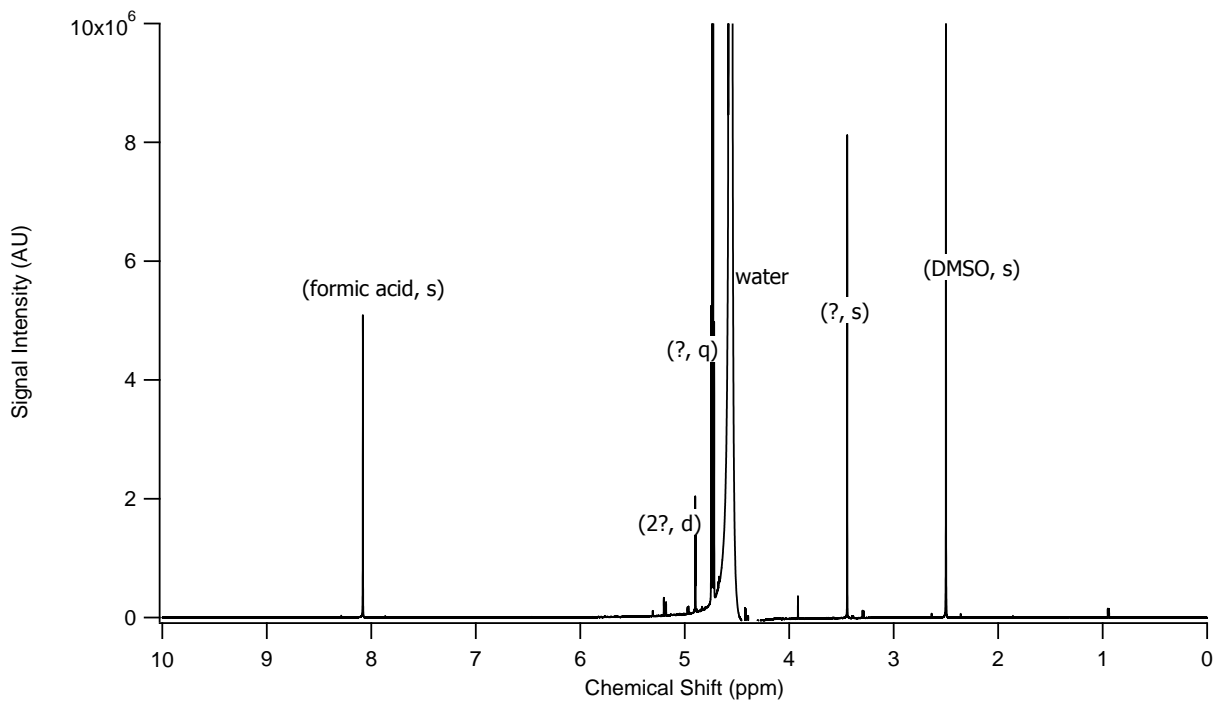
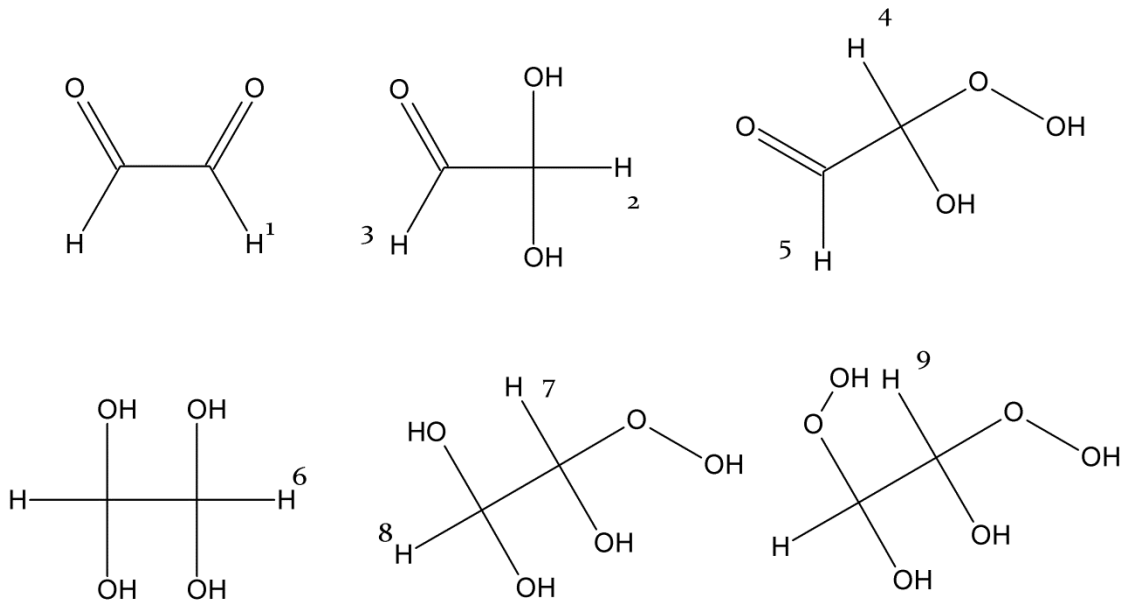


Figure S4. Glyoxal (10 mM) and H₂O₂ (17.7 mM)

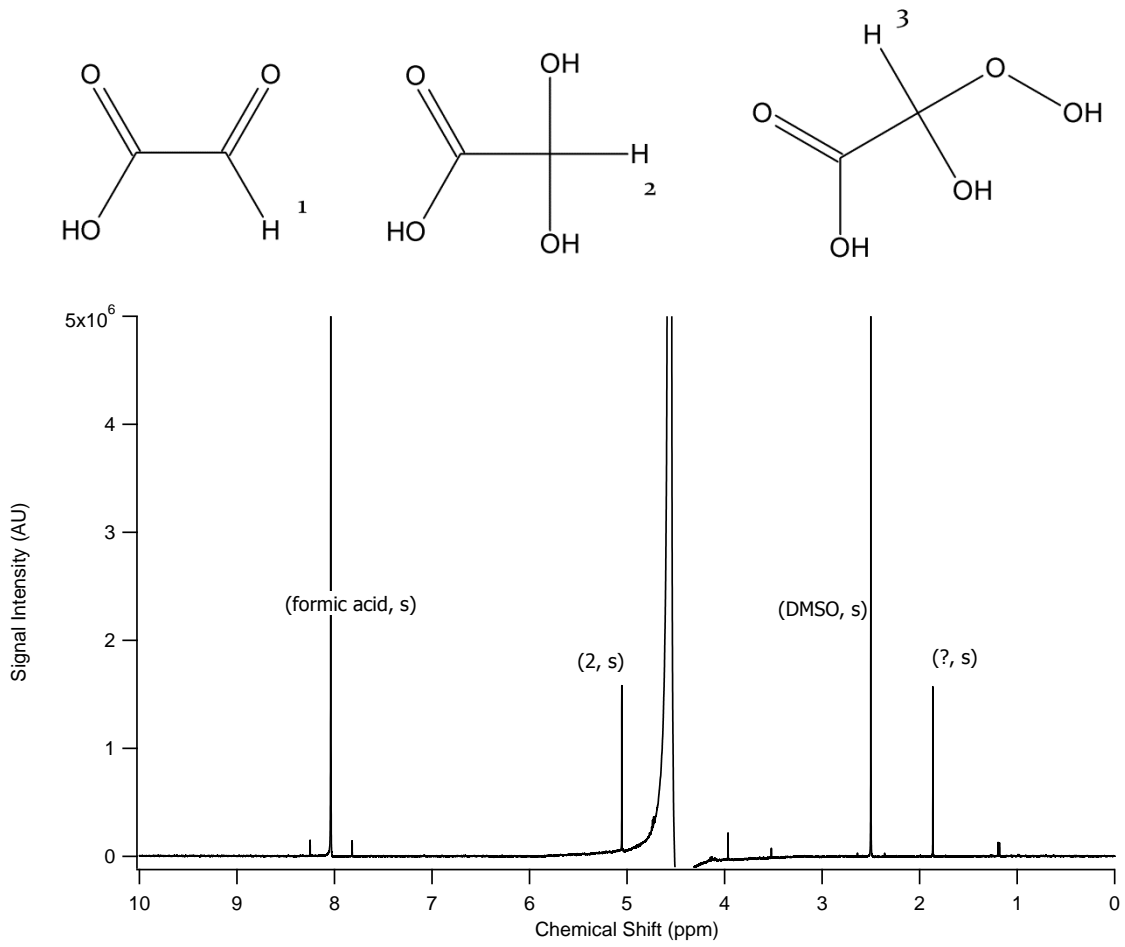


Figure S5. Glyoxylic acid (10 mM) and H_2O_2 (17.7 mM)

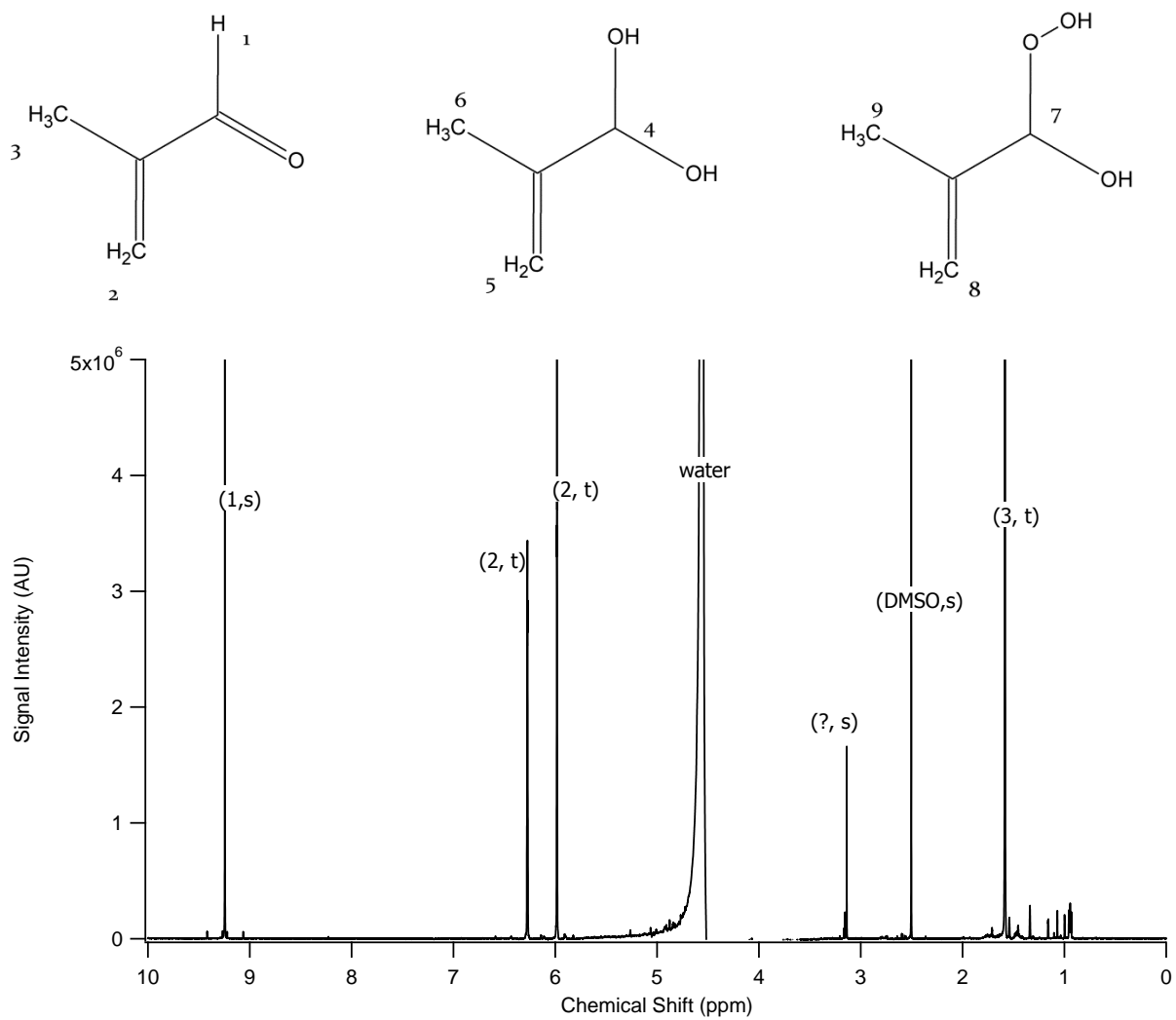


Figure S6. Methacrolein (10 mM) and H₂O₂ (100 mM)

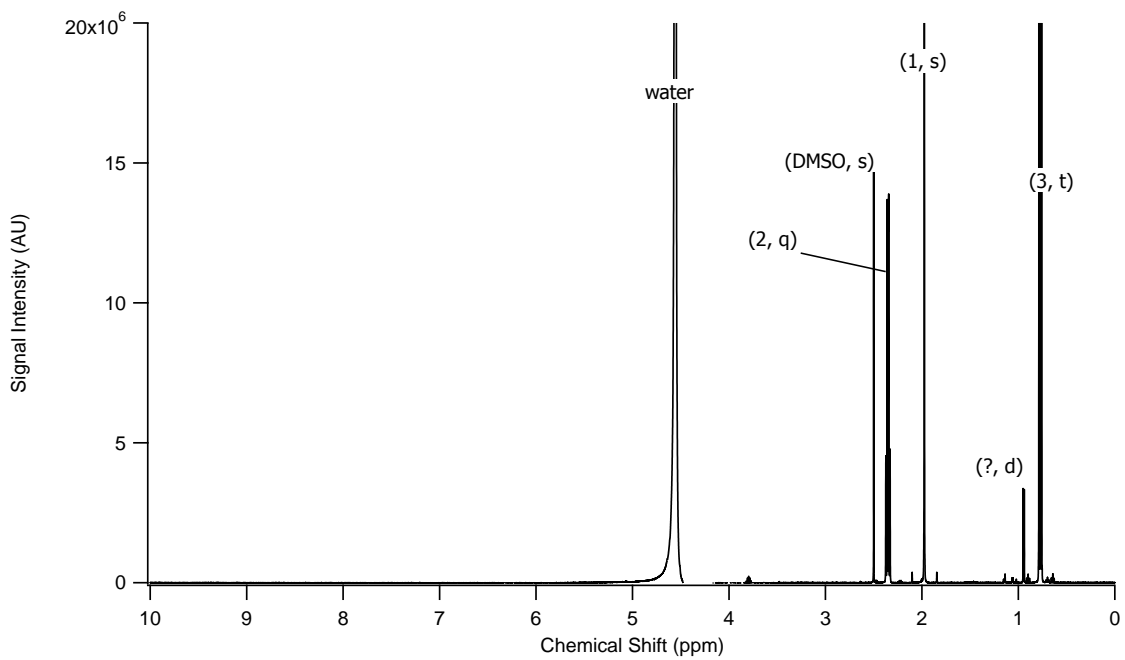
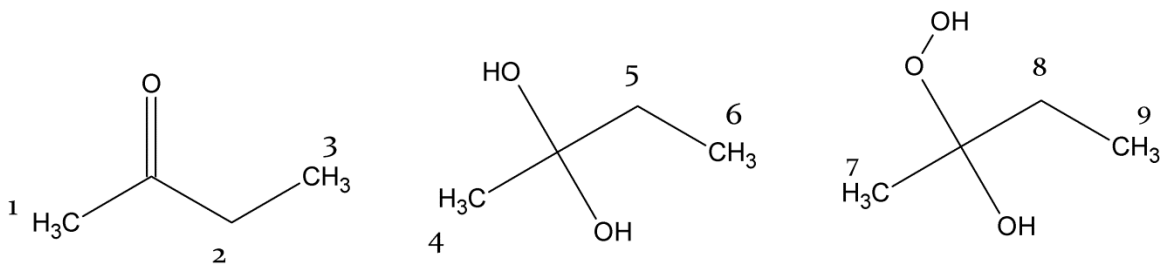


Figure S7. Methyl ethyl ketone (10 mM) and H_2O_2 (100 mM)

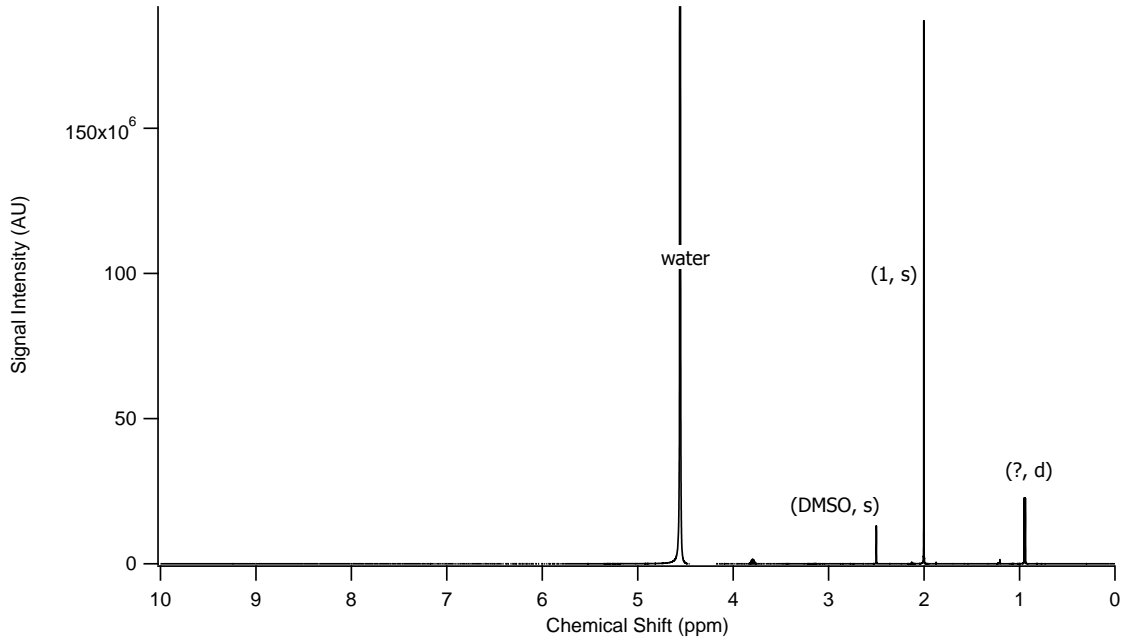
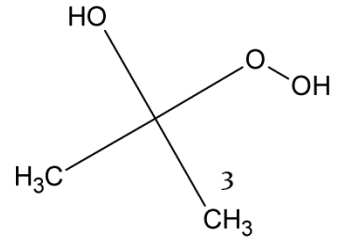
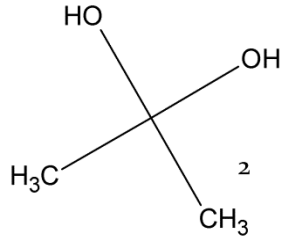
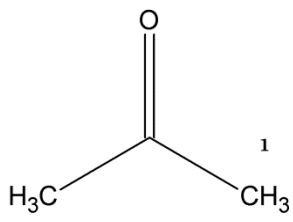


Figure S8. Acetone (10 mM) and H₂O₂ (100 mM)

| | K_{eq} determined (M^{-1}) | K_{hyd} determined | K_{eq} / K_{hyd} (M^{-1}) | K_{app} determined (M^{-1}) |
|-----------------|-------------------------------------|-------------------------|------------------------------------|--------------------------------------|
| formaldehyde | 1663405 | 2300* | 723 | 164 |
| acetaldehyde | 230 | 1.43 | 161 | 113.5** |
| propionaldehyde | 116 | 1.256 | 92 | 67.5** |
| glycolaldehyde | 727 | 16 | 45 | 43.3 |

Table S1. Comparison of K_{app} values experimentally determined and calculated as (K_{eq}/K_{app}).

*Was not determined from the current work, but taken from Betterton and Hoffmann 1988.

** Are the averaged values from the 1H NMR and the PTR-MS measurements.

Reference:

Betterton, E. A. and Hoffmann, M. R.: Henry law constants of some environmentally important aldehydes, Environ. Sci. Technol., 22, 1415-1418, 1988.