

Electronic Supplementary Information (ESI):

$\nu\text{C=O}$ frequency (FWHM), in cm^{-1}	Solid phase	Submonolayer on H_2O	Submonolayer on NAT
Hydroxyacetone	1731.2 ± 0.4 (15)	1733.1 ± 0.5 (23)	1725.0 ± 0.0 (22)
Acetone	1714.6 ± 0.4 (12)	1703.5 ± 0.0 (14)	1706.6 ± 0.3 (14)
Acetaldehyde	1727.8 ± 0.3 (10)	1723.4 ± 0.3 (10)	1720.2 ± 0.3 (10)
Benzaldehyde	1704.9 ± 0.2 (11)	1699.0 ± 0.3 (18.5)	1695.0 ± 0.0 (18.5)

Table S1: Frequency and FWHM (cm^{-1}) of the Gaussian functions used to fit the $\nu\text{C=O}$ band of hydroxyacetone, acetone, acetaldehyde and benzaldehyde in the solid phase and in submonolayer coverages on H_2O and NAT.

$\nu\text{C-C}$ frequency (FWHM), in cm^{-1}	Solid phase	Submonolayer on H_2O	Submonolayer on NAT
Acetone	1237.7 ± 0.3 (6.6)	1242.6 ± 0.4 (10)	1243.5 ± 0.5 (10)
Benzaldehyde	1207.9 ± 0.3 (7.5)	1212.9 ± 0.2 (10)	1216.5 ± 0.0 (10)

Table S2: Frequency and FWHM (cm^{-1}) of the Gaussian functions used to fit the $\nu\text{C-C}$ band of acetone and benzaldehyde in the solid phase and in submonolayer coverages on H_2O and NAT.