

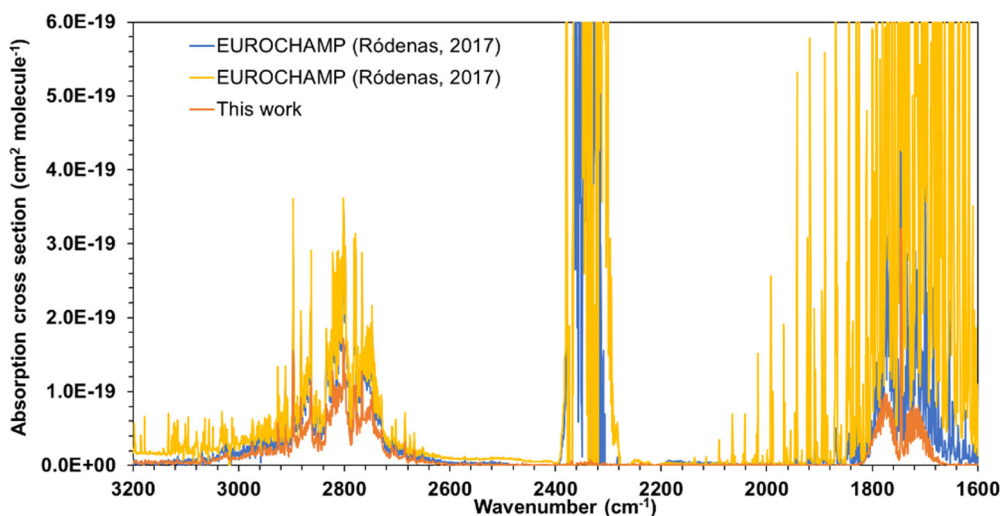
We greatly appreciate the following comment on the IR absorption cross sections presented in Figure S6.

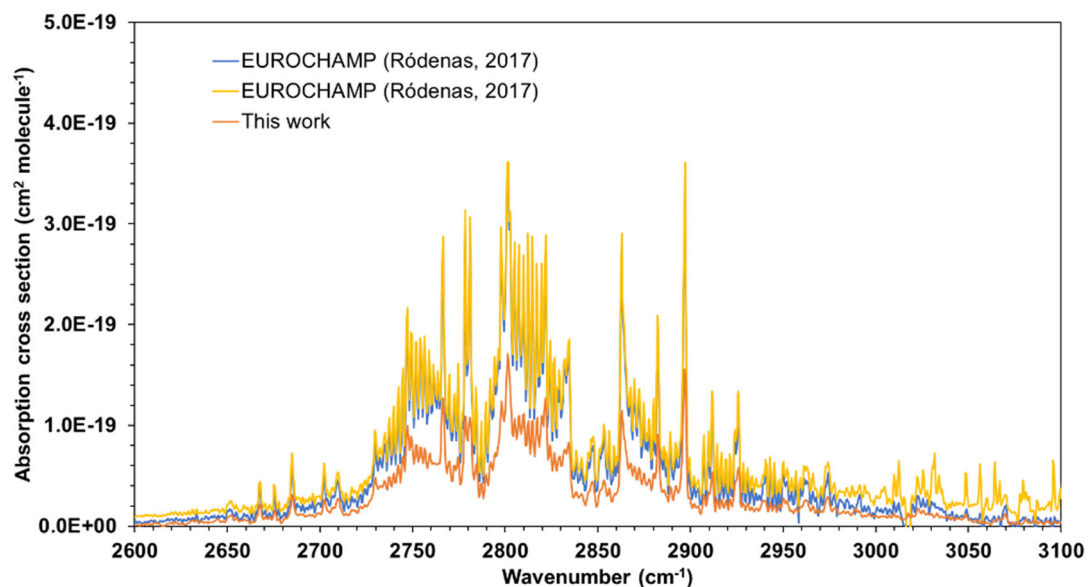
Editor's comment: *I have looked at Figure S6 and have some misgivings with the cross sections - values for HCHO and CO both seem very low to me (compared at least to what is used in our laboratory). Can you please check all of the cross section values in the figure, make sure they are being reported correctly, and indicate whether they are base 10 or base e. I think this is critical piece to assessing the reported product yields.*

Author's reply: The IR absorption cross sections reported in Figure S6 were expressed in base 10. To unify the way of expressing both the UV and IR absorption cross sections, all reported σ in the revised manuscript are now in base e. This has been indicated in the revised text.

Regarding the low **absorption cross sections of CO**, the editor is totally right. When we initially merged the IR spectra of CO and HCl, at some point before submitting the paper, the scaling factor was deleted. We are thankful for pointing this error out that we have corrected. Now, in Figure S6 this scaling factor (divided by 5) was added in the figure. We also want to highlight that CO IR spectrum is highly structured and the spectral resolution may lead to differences in the measured absorption cross sections. The reference IR spectrum used in our work for identification, not quantification, of CO was recorded at 1 cm^{-1} spectral resolution.

Concerning the absolute values of the **IR absorption cross sections of formaldehyde**, after changing the base 10 to base e, we have compared them with those calculated from two single IR spectra recorded in EUROCHAMP project (Ródenas et al., 2017) with the same resolution as that used in this work (1 cm^{-1}). Our values are around 2 times lower than the EUROCHAMP values. Note that the latter spectra present large absorption from CO_2 and H_2O below 2400 cm^{-1} . So, we have only compared the 3100-2600 cm^{-1} band.

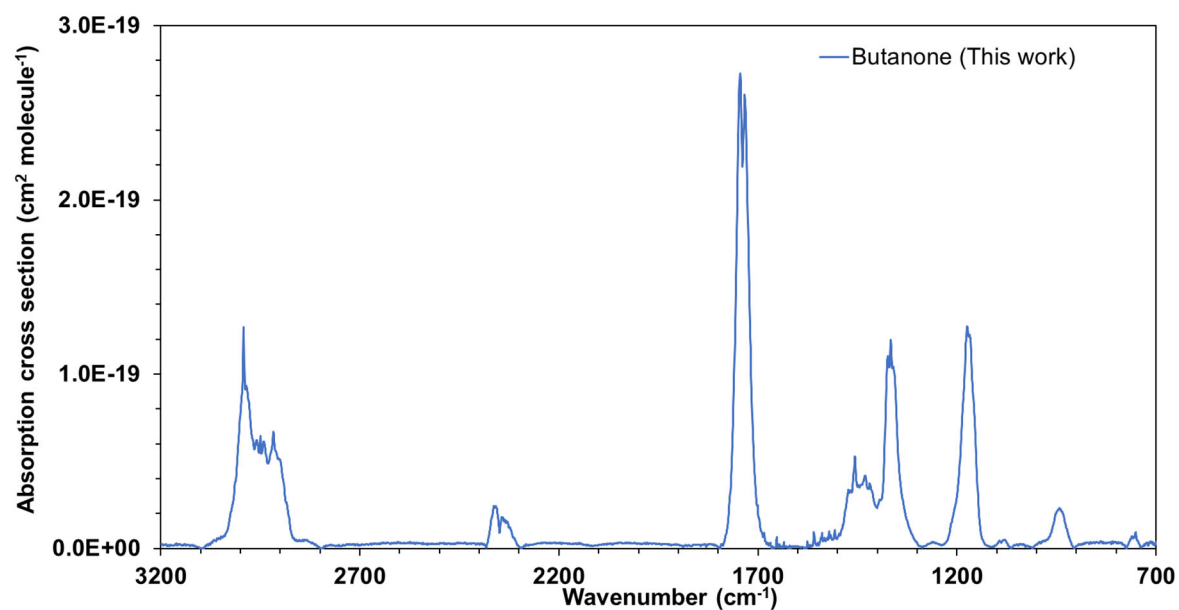
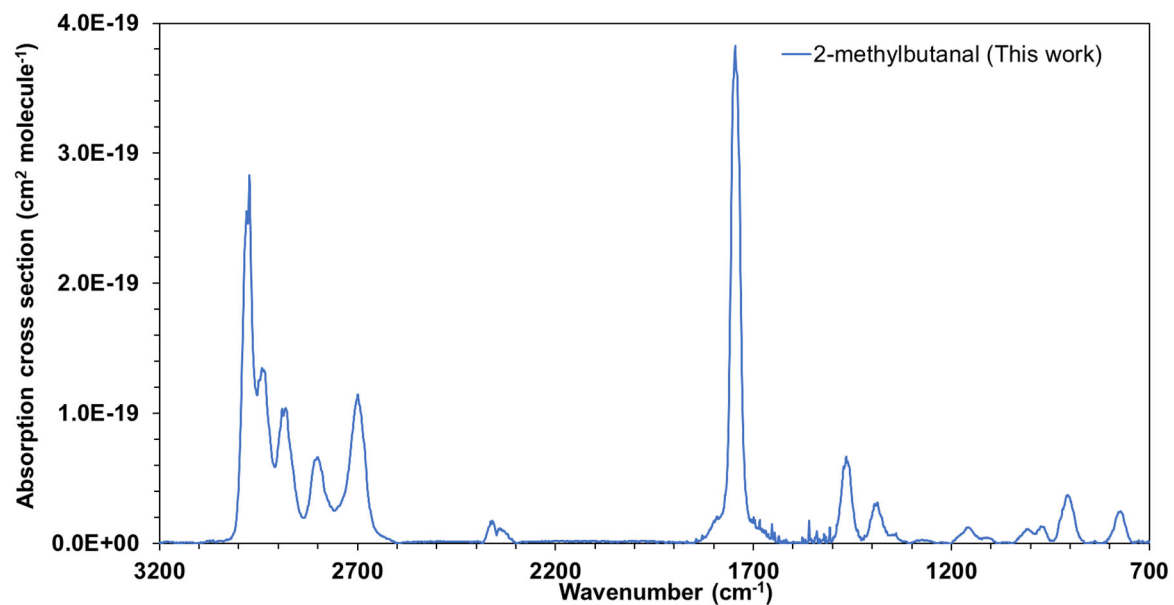




The source of this discrepancy can be related with the accuracy in knowing the formaldehyde concentration, which was synthesized from paraformaldehyde. For that reason, we were reticent to provide the absolute absorption cross sections in Figure S6. *Nevertheless, as we just use this spectrum for identification, the absolute values would need to be refined when needed for quantification.* To report more accurate IR absorption cross sections, as said before, it is better to follow the same procedure as that used for butanone and 2MB (see below).

IR absorption cross sections for quantification of 2MB and butanone

2MB and butanone are the two only compounds for which their IR absorption cross sections had to be determined in our lab to be quantified in this work. Their IR absorption cross sections (**in base e**) reported in the manuscript are plotted in the following figures.



These values were determined from the slope of Beer-Lambert plots considering NINE IR spectra for 2MB and SIX for butanone, as shown in the plots below. This procedure provides more accurate IR absorption cross sections than those obtained from a single IR spectrum.

