

Review of ACP submission ‘Temperature-dependent aqueous OH kinetics of C2-C10 linear and terpenoid alcohols and diols: new rate coefficients, structure-activity relationship and atmospheric lifetimes’ by B. Witkowski et al., MS egosphere-2023-1381

General

This is a quite interesting study of the kinetics of OH radicals with a number of linear and branched, terpenoid alcohols in aqueous solution. This topic has been treated before quite extensively but the work contributes some new kinetic data of interest for atmospheric multiphase and aqueous chemistry.

The whole paper could benefit from a thorough revision. All Figures and data presented should be discussed in detail, I think there is more to discover in the big data set obtained here. At times, I am missing text describing more of the findings.

Details

Table 1: The literature coverage is not really complete. The reactions of alcohols with OH have been reviewed by the IUPAC task group on atmospheric chemical kinetics and, accordingly, an overview on OH + EtOH in aqueous solution can be found here = https://iupac-aeris.ipsl.fr/datasheets/pdf/AQ_OH_2.pdf . Checking this might be useful for other alcohols. If we stay with OH + EtOH, why are only three previous studies reported ? Is the IUPAC task group site is used, please reference it accordingly.

The errors given in Table 1 appear very small to me. How were they derived ? Some of the means values are given with too many figures in view of the derived mean error. Please check the results' numerical format after re-checking the error margins of the derived mean rate constants.

Figure 5: Can you do a plot of both the gas phase and the aqueous phase data in one plot, maybe you can add it as a panel (C) ? Are the rate constants about the same ? Are there differences ? Why ?

Table 2: How do you interpret the obtained values for ΔS^\ddagger on a molecular basis ? Check your sign for double-degga.

Line 376: This number is disputable. Cloud processing occurs for shorter periods interrupted by cloud evaporations. To which reference time do these 18 h refer ? The total lifetime of an aqueous particle ? That would be good to add.