# New insights into the cystine-sulfite reaction

**Matteo Zecchini[1], Robert Lucas [2] and Adam Le Gresley [1,*]**

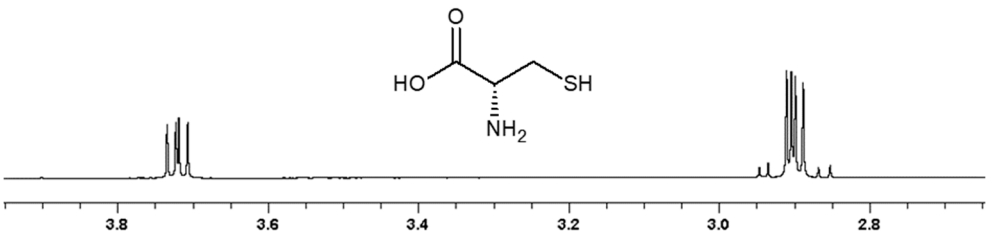
[1] Kingston University, Surrey, KT1 2EE, UK; m.zecchini@kingston.ac.uk

[2] GlaxoSmithKline, Consumer Healthcare, Weybridge, UK; Robert.a.lucas@gsk.com

* Correspondence: a.legresley@kingston.ac.uk; Tel.: +44-(0)208-4177432

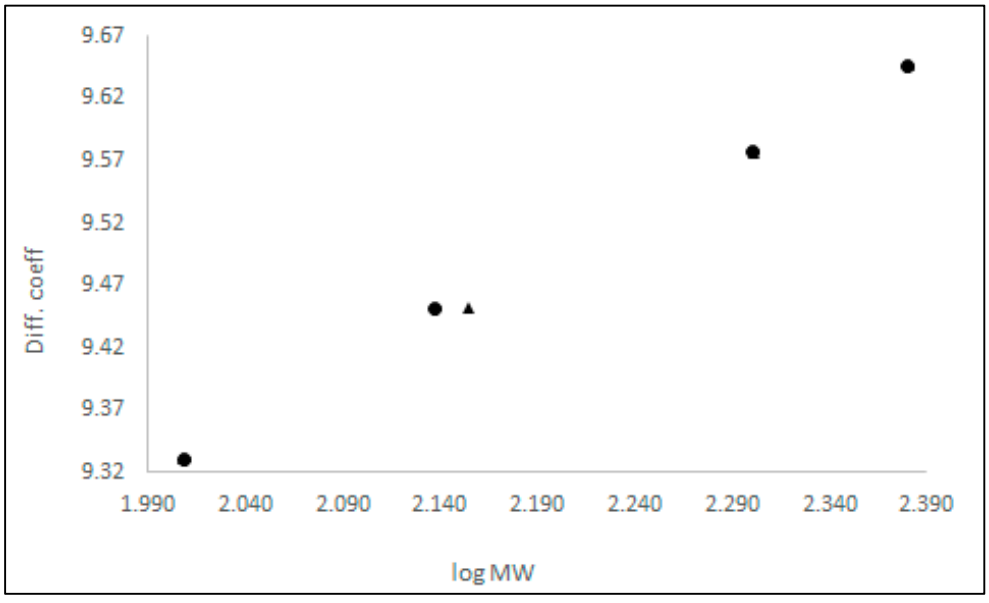
## Supporting information

S1 NMR spectrum showing cysteine at pH 8-9




Proton NMR of Cysteine in $D_2O$ at pH 8-9.

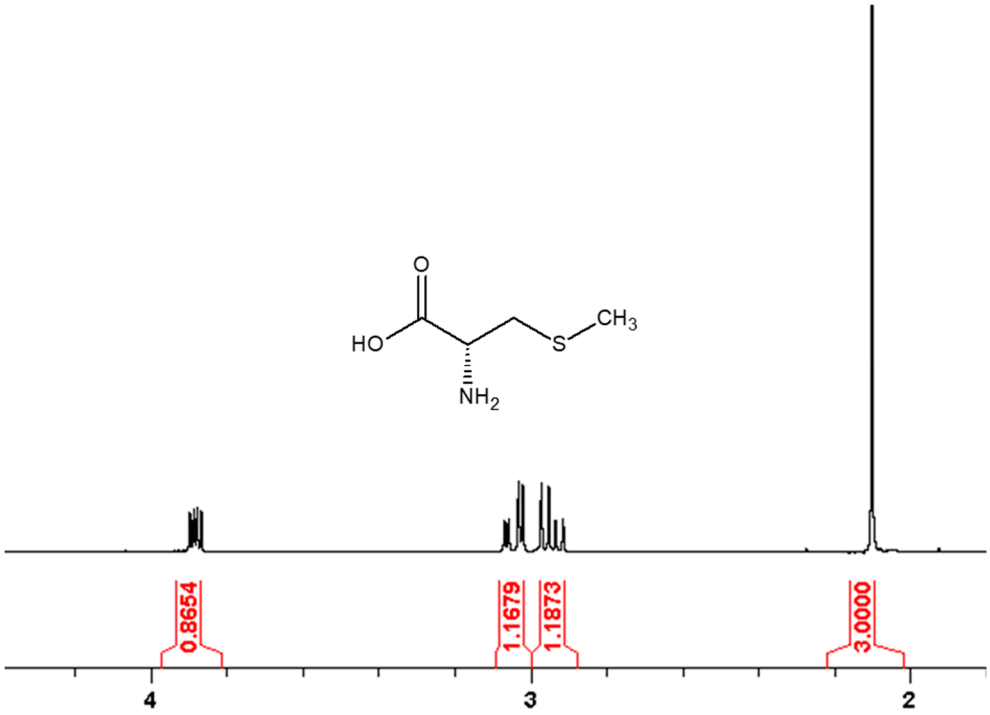
S2 Linearity of diffusion correlation with MW




Theoretical (●) and experimental (▲) correlation of LogMW vs LogD show good linearity, where in details ●: $y=0.8477x + 7.6271$, $R^2=0.9999$ and ▲: $y=0.8353x + 7.6582$, $R^2=0.9981$.

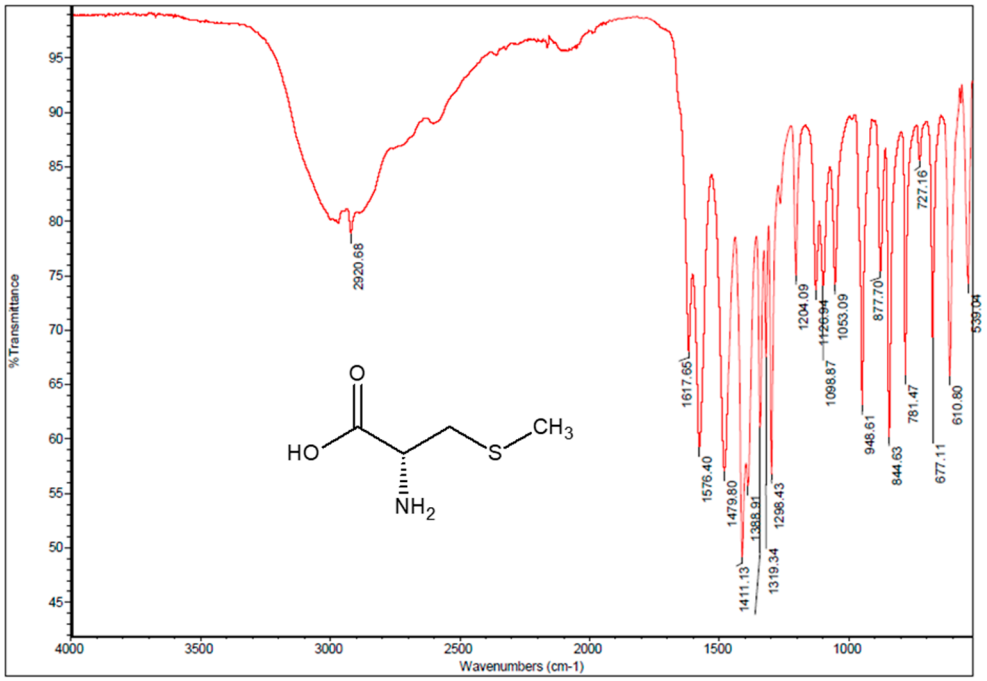
S3 NMR and FT-IR data of S-methyl-L-cysteine

$^1$H-NMR.




Proton NMR of S-methyl-L-cysteine in $D_2O$.

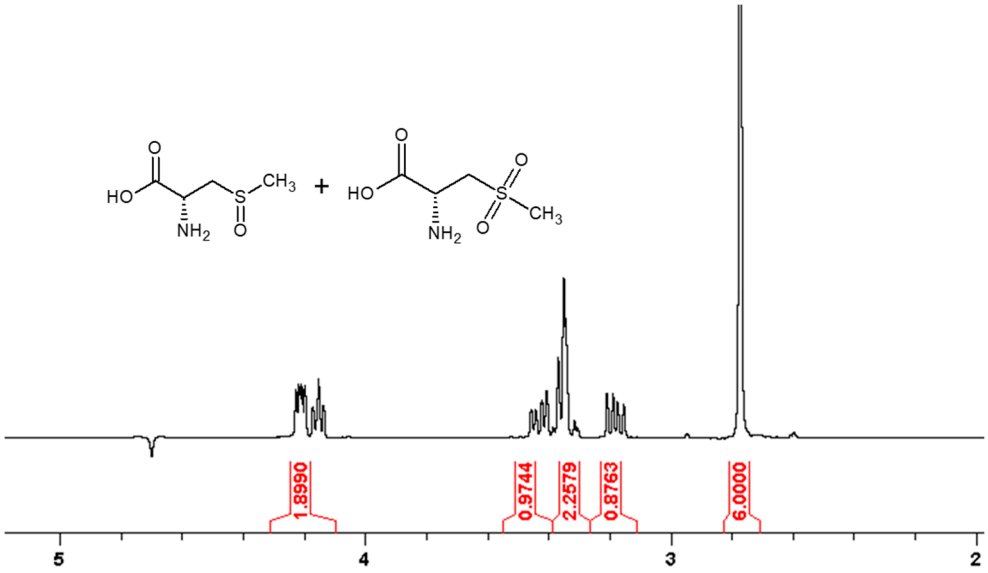
FT-IR.




FT-IR of S-methyl-L-cysteine obtained as a white solid.

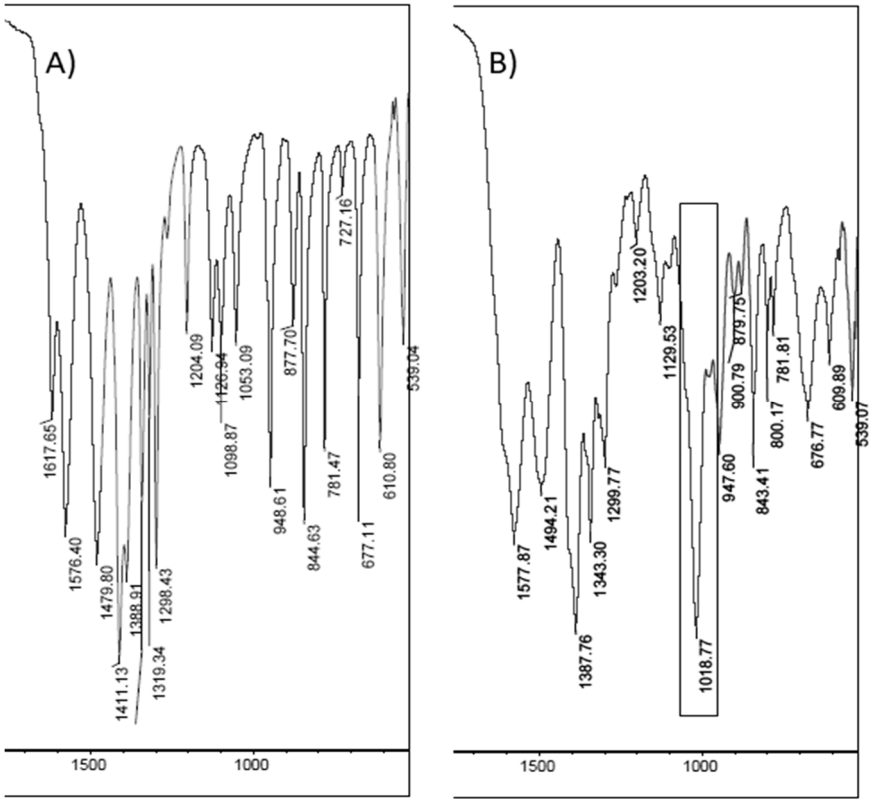
S4 NMR and FT-IR in support of the presence of sulfenic acid and further oxidation to a sulphone

$^{1}$H-NMR.




Proton NMR of the mixture of Sulfoxide and Sulfone given by the oxidation of the S-Me-L-Cysteine.

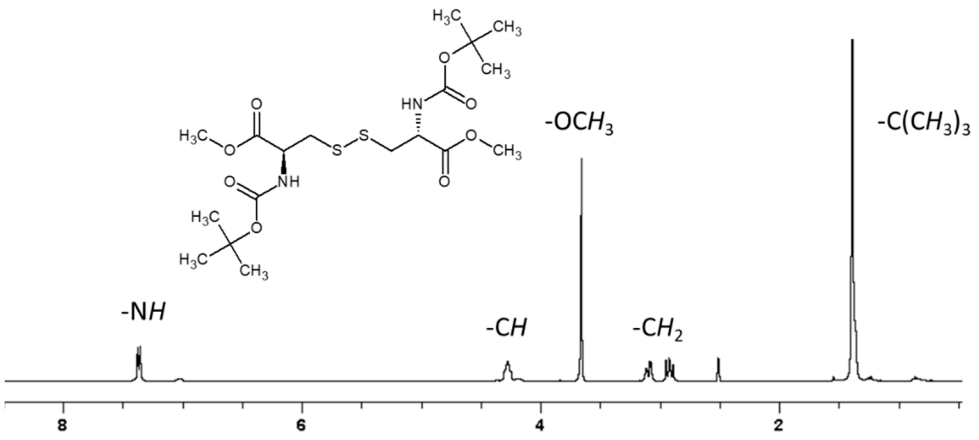
FT-IR.




FT-IR spectra of reactiom. The intense stretching around 1000 cm-1 (spectrum B) could be the S-O bond not present in the SM (spectrum A).

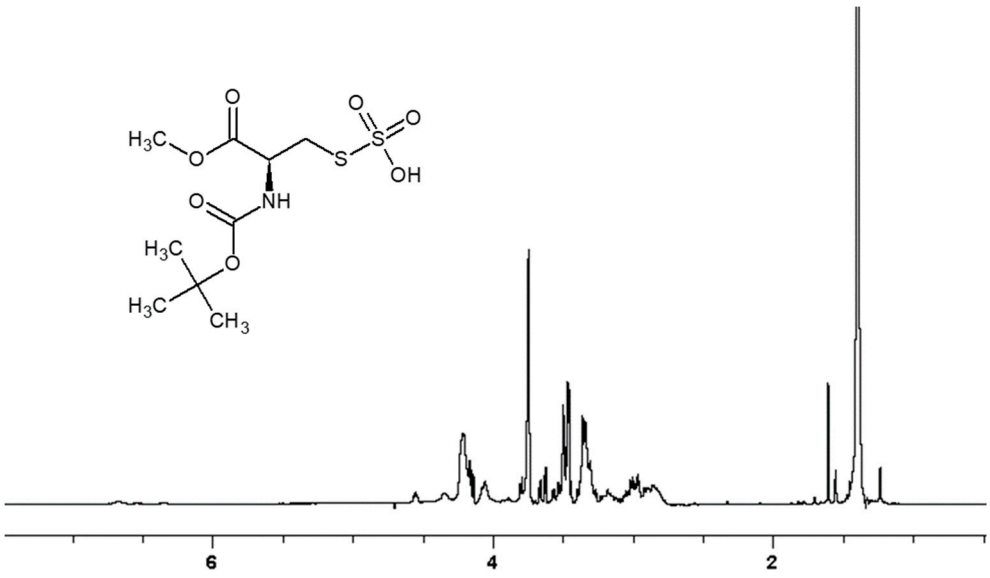
S5 Reaction of **8** with sulfite resulted in an intractable mixture, possibly resulting from cyclisation of the formed sulfenic acid (Supporting Information S5)

$^1$H-NMR of **8**.



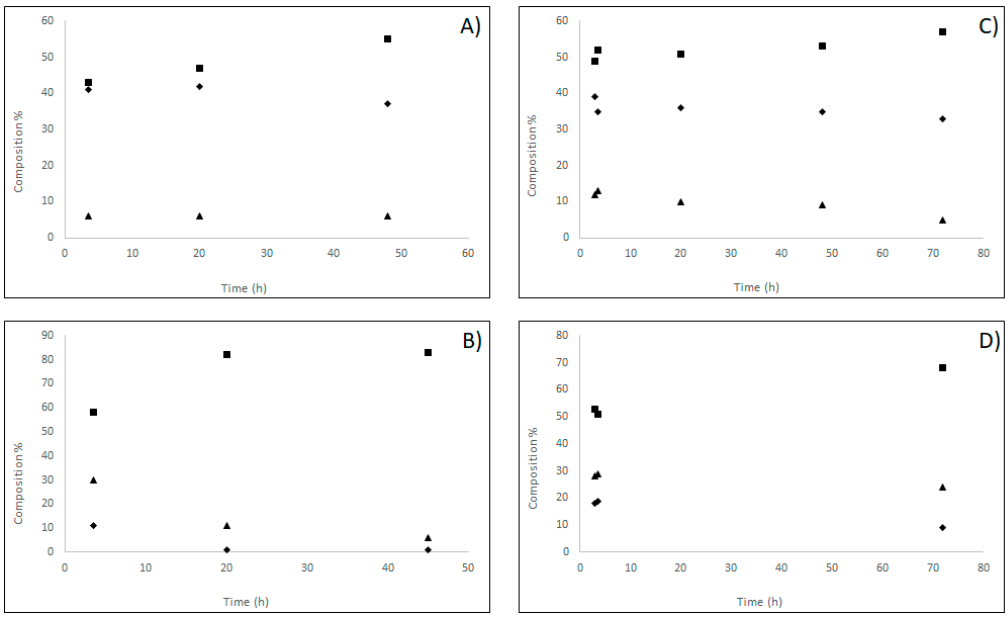

Proton NMR for starting material **8** in DMSO-$_{d6}$.

$^1$H-NMR for the crude reaction mixture.




Proton NMR for an aliquot of the reaction mixture dried under nitrogen (80$^o$C-12h). Spectrum recorded in $H_2O/D_2O$. The desired compound was not identified in the crude mixture.

S6 Combined Temperature and UV effects with varying pH




Comparison between the effect of temperature (65ºC) at A) pH4 and B) pH9 and effect of UV light (30s-254nm) and temperature (65ºC) at C) pH4 and D) pH9.

**Table 1**. Variation in the reaction mixture percentage composition after UV exposure at high temperature.

| pH9-85ºC | Time (h) | 2 (%) | 4 (%) | 1 (%) |
|---|---|---|---|---|
| | 2 | 37 | 34 | 28 |
| | 2.5 | 42 | 31 | 23 |
| **+ 10s UV-254nm** | | | | |
| | 3 | 42 | 31 | 23 |
| | 20 | 53 | 26 | 18 |
| | 48 | 55 | 19 | 18 |
| **+ 30s UV-254nm** | | | | |
| | 3 | 39 | 31 | 25 |
| | 20 | 47 | 28 | 20 |
| | 48 | 57 | 20 | 19 |