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# Supplementary Material

## Detection of Trace Amounts of Water in Organic Solvent by 8-Hydroxypyrene-1,3,6-Trisulfonic Acid Trisodium Salt

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### Table of content

**Table S1**: Comparison of water sensor with present system.

| DL | QL | Literature |
|---|---|---|
| 0.04 (EtOH) | 0.1 (EtOH) | 2 |
| 0.008 (EtOH) [a] | Not Given | 3 |
| 0.006 (EtOH) [a] | Not Given | 4 |
| 0.1 (EtOH)<br>0.008 (DMF) | 0.3 (EtOH)<br>0.03 (DMF) | 5 |
| 0.000108 (DMF)<br>0.000442 (DMSO)<br>0.000335 (EtOH)<br>0.000440 (MeOH) | 0.000362 (DMF)<br>0.00147 (DMSO)<br>0.00111 (EtOH)<br>0.00146 (MeOH) | Present work |
| [a] Results expressed using volume/volume percent (v/v%). | | |

**Table S2.** Calibration equations.[1]

| | | |
|---|---|---|
| DMF: | $F = -2x10^{-8} (H_2O) + 5x10^{6}$<br>($R=0.99$, $[H_2O] = 0.00$ to $9.09x10^{-3}$ wt %) Trial I<br>$F= -3x10^{-8} (H_2O) + 6x10^{6}$<br>($R=0.99$, $[H_2O] = 0.00$ to $9.09x10^{-3}$ wt %) Trial II<br>$F= -3x10^{-8} (H_2O) + 6x10^{6}$<br>($R=0.99$, $[H_2O] = 0.00$ to $9.09x10^{-3}$ wt %) Trial III | (1) |
| DMSO | :$F = -2x10^{-8} (H_2O) + 6x10^{6}$<br>($R = 0.99$, $(H_2O) = 0.00$ to $10.54x10^{-3}$ wt %) Trial I<br>$F = -3x10^{-8} (H_2O) + 6x10^{6}$<br>($R = 0.99$, $(H_2O) = 0.00$ to $10.54x10^{-3}$ wt %) Trial II<br>$F = -3x10^{-8} (H_2O) + 6x10^{6}$<br>($R = 0.99$, $(H_2O) = 0.00$ to $10.54x10^{-3}$ wt %) Trial II | (2) |
| EtOH: | $F = -1x10^{-8} (H_2O) + 4x10^{6}$<br>($R = 0.98$, $[H_2O] = 0$ to $12.67x10^{-3}$ wt %) Trial I<br>$F = -1x10^{-8} (H_2O) + 4x10^{6}$<br>($R = 0.99$, $[H_2O] = 0$ to $12.67x10^{-3}$ wt %) Trial II<br>$F = -1x10^{-8} (H_2O) + 5x10^{6}$<br>($R = 0.99$, $[H_2O] = 0$ to $12.67x10^{-3}$ wt %) Trial III | (3) |
| MeOH: | $F = -7x10^{-7} (H_2O) + 4x10^{6}$<br>($R = 0.99$, $(H_2O) = 0$ to $12.62x10^{-3}$ wt %) Trial I<br>$F = -1x10^{-8} (H_2O) + 4x10^{6}$<br>($R = 0.98$, $(H_2O) = 0$ to $12.62x10^{-3}$ wt %) Trial II<br>$F = -1x10^{-8} (H_2O) + 4x10^{6}$<br>($R = 0.99$, $(H_2O) = 0$ to $12.62x10^{-3}$ wt %) Trial III | (4) |

Here R is defined as slope, which is the ratio of the change in fluorescence intensity and change in water contain in wt %. The slope R was determined for all above studied solvents by recoding change in fluorescence intensity of the HPTS dye.

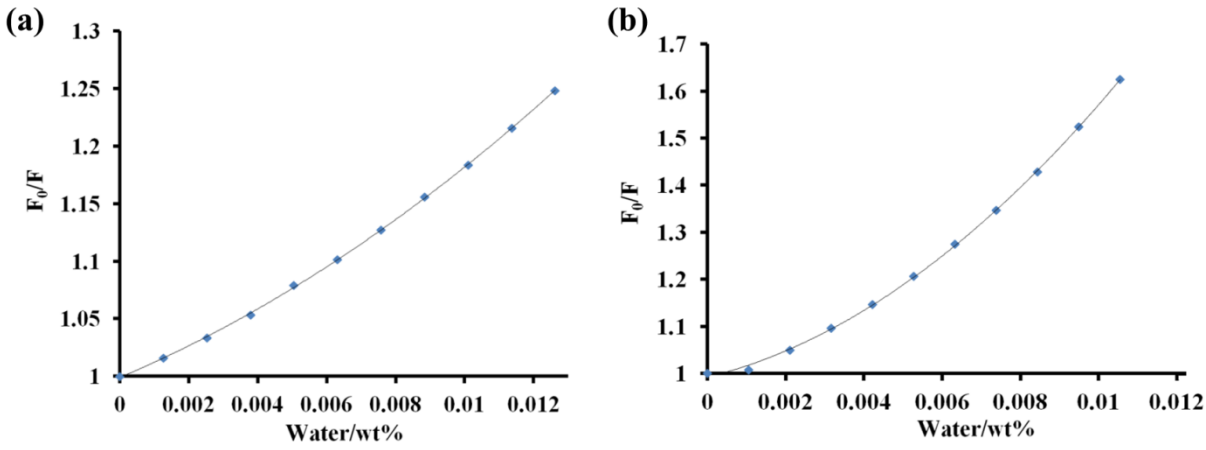


**Fig S1**. The Stern-volmer plot of HPTS in Methanol (a) and DMSO (b).

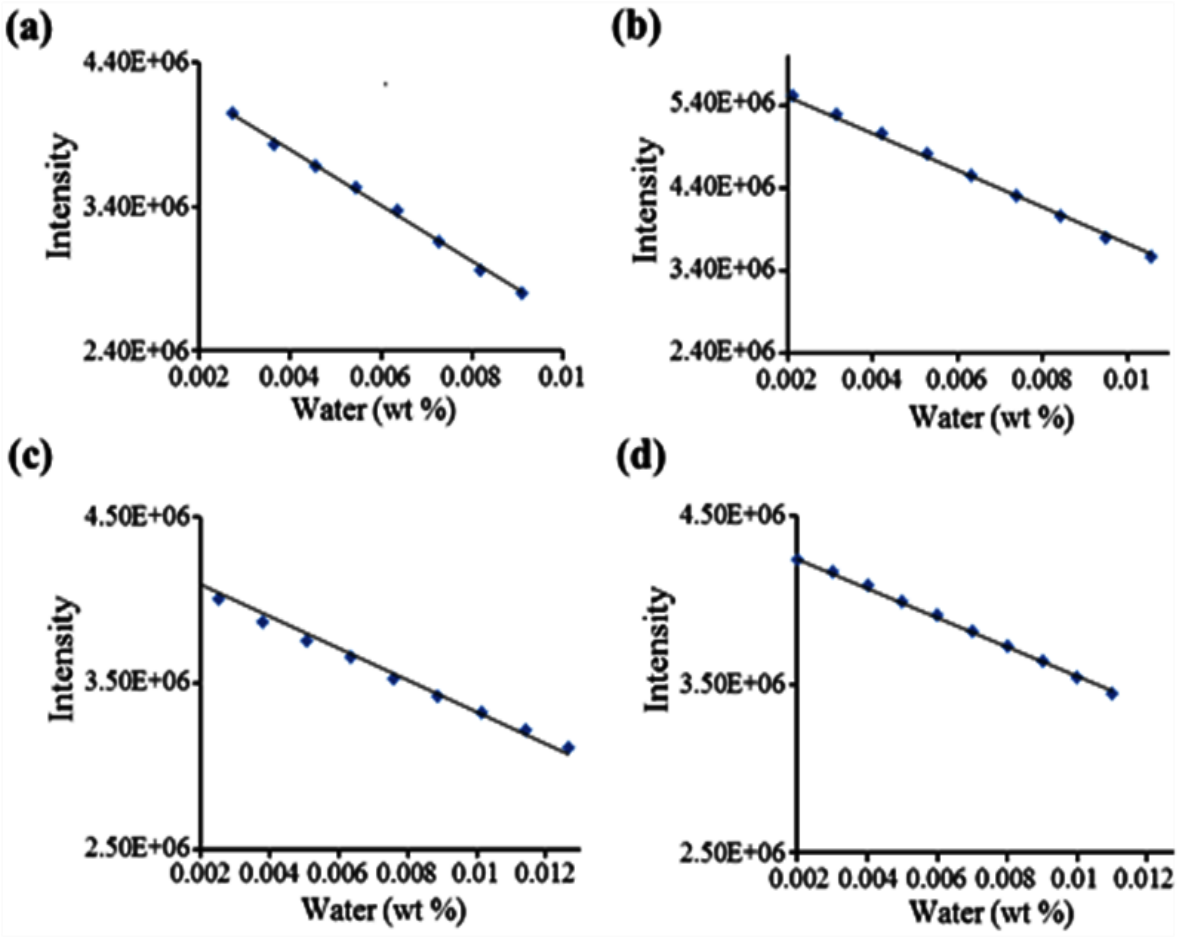


**Fig S2.** The plot of HPTS ($3x10^{-6}$ M) emission intensity at 413 nm ($\lambda_{ex}$ = 380 nm) upon addition of water in organic solvents such as (a) DMF (b) DMSO (c) EtOH and (d) MeOH

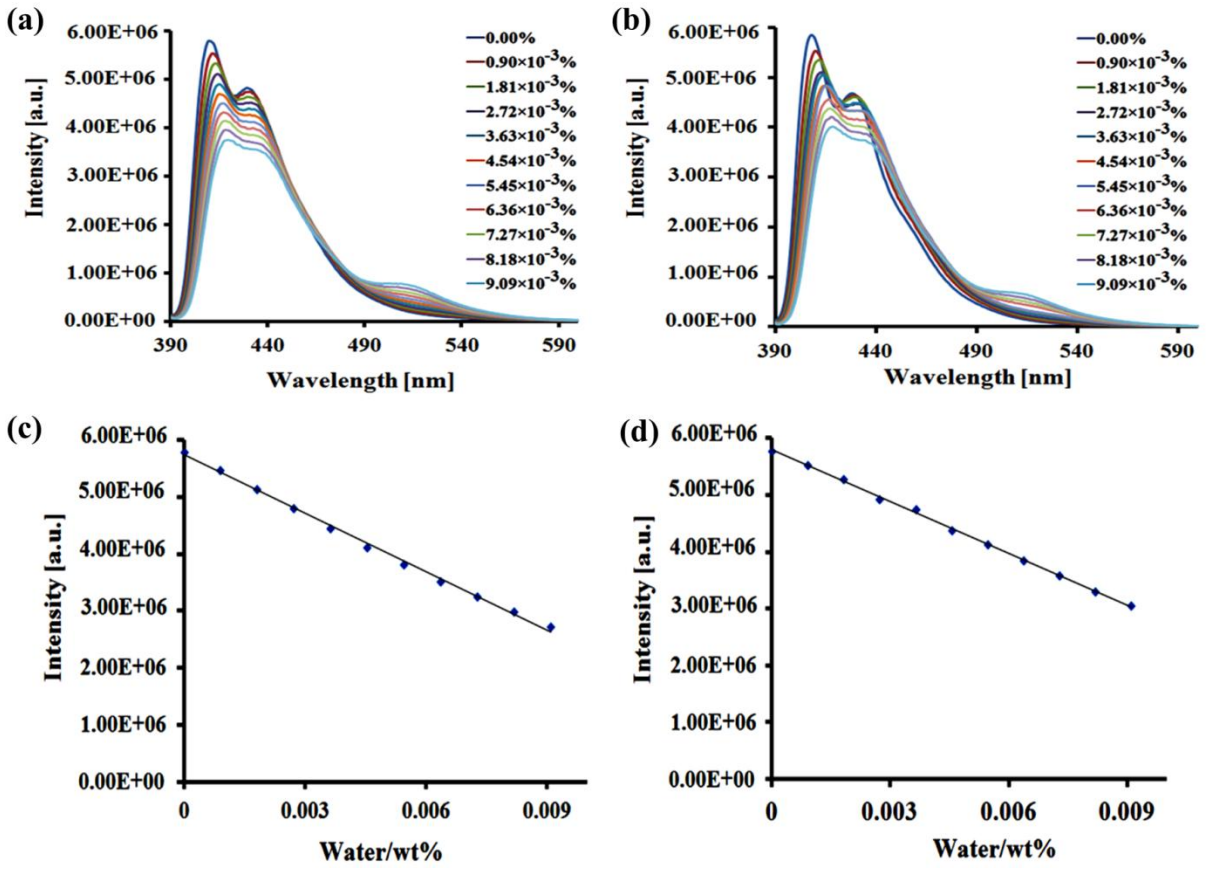


**Fig S3**. Changes in the emission of HPTS ($3x10^{-6}$ M) and changes in fluorescence intensity at 410 nm ($\lambda_{ex}$ = 380 nm) with increasing water content in DMF; (a and c) 2nd trial and (b and d) 3rd trial respectively.

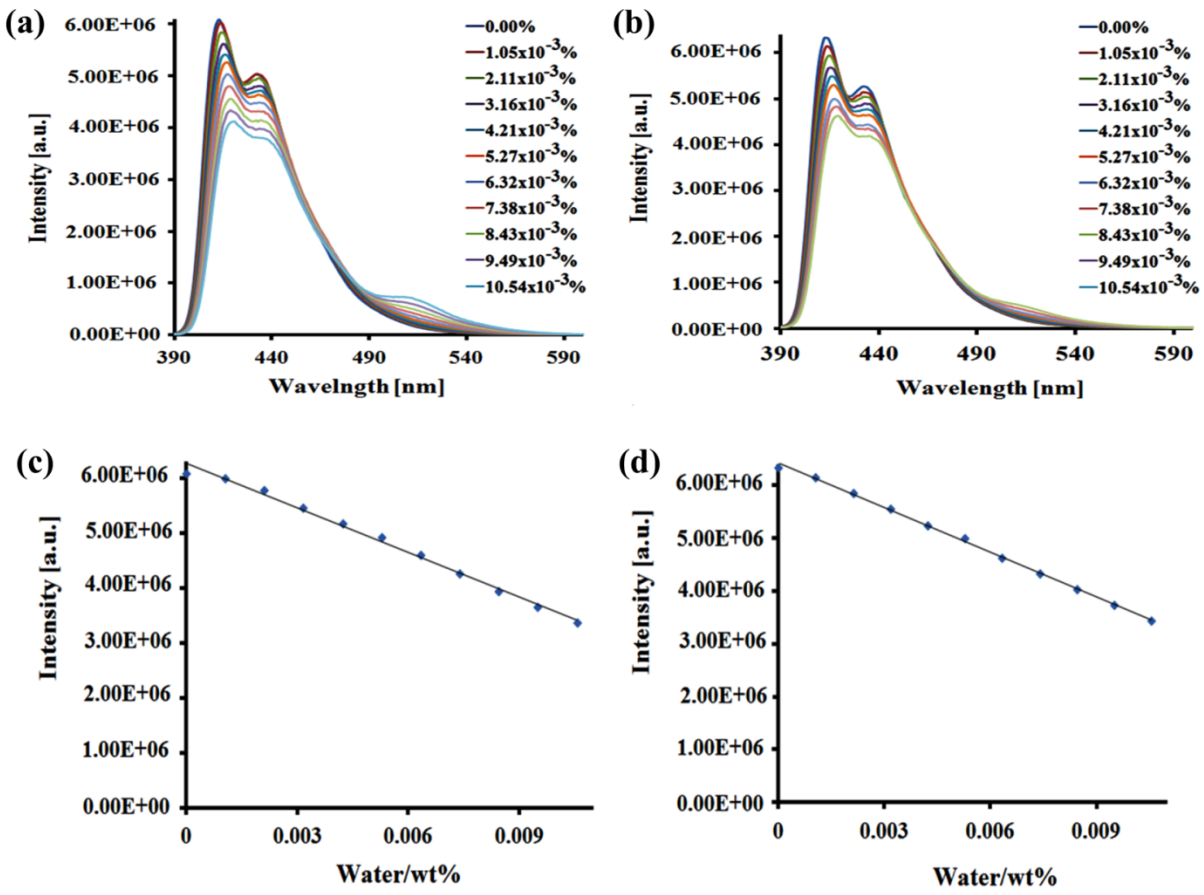


**Fig S4.** Changes in the emission of HPTS ($3x10^{-6}$ M) and changes in fluorescence intensity at 413 nm ($\lambda_{ex}$ = 380 nm) with increasing water content in DMSO; (a and c) 2nd trial and (b and d) 3rd trial respectively.

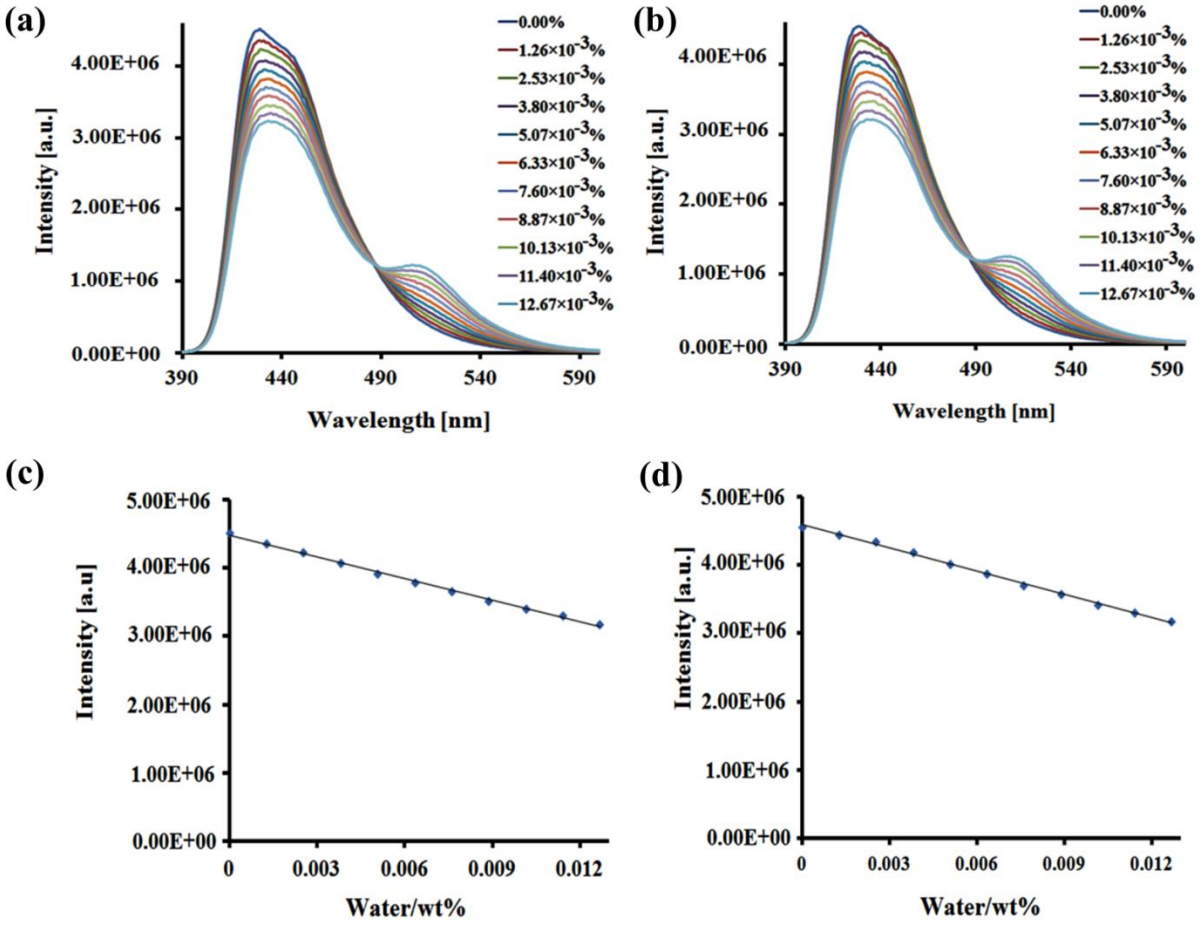


**Fig S5.** Changes in the emission of HPTS ($3x10^{-6}$ M) and changes in fluorescence intensity at 413 nm ($\lambda_{ex}$ = 380 nm) with increasing water content in EtOH; (a and c) 2nd trial and (b and d) 3rd trial respectively.

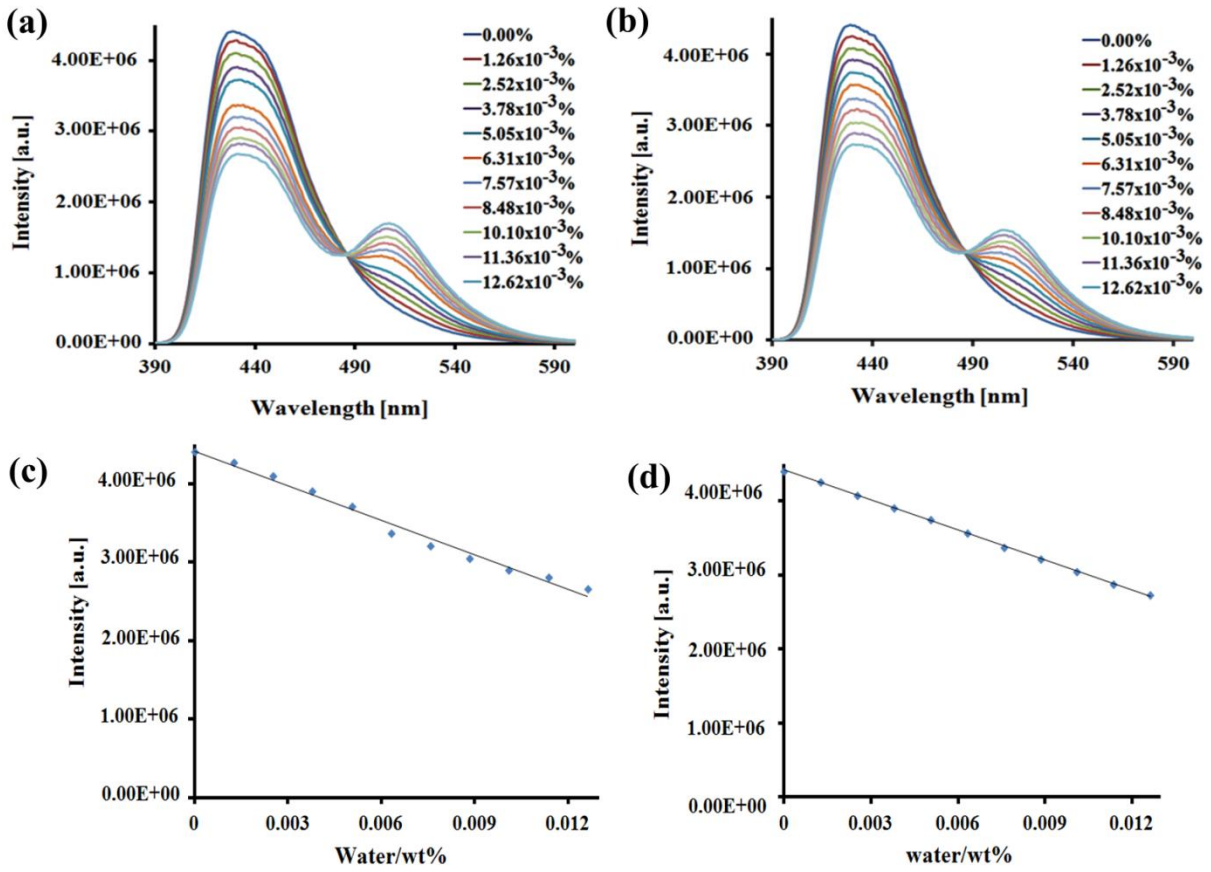


**Fig S6.** Changes in the emission of HPTS ($3x10^{-6}$ M) and changes in fluorescence intensity at 427 nm ($\lambda_{ex}$ = 380 nm) with increasing water content in MeOH; (a and c) 2nd trial and (b and d) 3rd trial respectively.

**Table 2**: DL and QL of HPTS for water determination in organic solvents.

| | | Trial I | Trial II | Trial III |
|---|---|---|---|---|
| DMF | DL | $1.15x10^{-4}$ | $1.09X10^{-4}$ | $1.02X10^{-4}$ |
| | QL | $3.83x10^{-4}$ | $3.64X10^{-4}$ | $3.41X10^{-4}$ |
| DMSO | DL | $4.89x10^{-4}$ | $4.26X10^{-4}$ | $4.12X10^{-4}$ |
| | QL | $1.63x10^{-3}$ | $1.41X10^{-3}$ | $1.37X10^{-3}$ |
| EtOH | DL | $3.89x10^{-4}$ | $3.13X10^{-4}$ | $3.03X10^{-4}$ |
| | QL | $1.29x10^{-3}$ | $1.04X10^{-3}$ | $1.01X10^{-3}$ |
| MeOH | DL | $4.79x10^{-4}$ | $4.25X10^{-4}$ | $4.18X10^{-4}$ |
| | QL | $1.59x10^{-3}$ | $1.41X10^{-3}$ | $1.39X10^{-3}$ |

## Reference


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