# 2-Hydroxyarylimidazole based Colorimetric and Ratiometric Fluoride ion Sensors 

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Fig. S1. Absorption spectra of $\mathbf{4 a}$ after addition of 20 equiv. of different anions recorded in ACN


Fig. S2. Absorption spectra of $\mathbf{4 a}+F^{-}$(20 equiv.) on addition of different amount of MeOH recorded in ACN


Fig. S3. Absorption spectra of $\mathbf{4 a}+\mathrm{AcO}^{-}$(20 equiv.) on addition of different amount of MeOH recorded in ACN


Fig. S4. Absorption spectra of $\mathbf{4 a}$ after addition of 20 equiv. of different anions recorded in $\mathrm{MeOH}+\mathrm{ACN}(1 \% \mathrm{v} / \mathrm{v})$


Fig. S5. Absorption spectra of $\mathbf{4 b}$ after addition of 20 equiv. of different anions recorded in ACN


Fig. S6. Absorption spectra of $\mathbf{4 b}+F^{-}$(20 equiv.) on addition of different amount of MeOH recorded in ACN


Fig. S7. Absorption spectra of $\mathbf{4 b}+\mathrm{AcO}^{-}$(20 equiv.) on addition of different amount of MeOH recorded in ACN


Fig. S8. Absorption spectra of $\mathbf{4 b}$ after addition of 20 equiv. of different anions recorded in $\mathrm{MeOH}+\mathrm{ACN}(4 \% \mathrm{v} / \mathrm{v})$


Fig. S9. Emission spectra of $\mathbf{4 a}$ after addition of 20 equiv. of different anions recorded in ACN


Fig. S10. Emission spectra of $\mathbf{4 a}+F^{-}$(20 equiv.) on addition of different amount of MeOH recorded in ACN


Fig. S11. Emission spectra of $\mathbf{4 a}+\mathrm{AcO}^{-}$(20 equiv.) on addition of different amount of MeOH recorded in ACN


Figure S12 Emission spectra of $\mathbf{4 a}$ after addition of 20 equiv. of different anions recorded in $\mathrm{MeOH}+\mathrm{ACN}(1 \% \mathrm{v} / \mathrm{v})$


Fig. S13. Emission spectra of 4b after addition of 20 equiv. of different anions recorded in ACN


Fig. S14. Emission spectra of $\mathbf{4 b}+F^{-}$(20 equiv.) on addition of different amount of MeOH recorded in ACN


Fig. S15. Emission spectra of $\mathbf{4 b}+\mathrm{AcO}^{-}$(20 equiv.) on addition of different amount of MeOH recorded in ACN


Fig. S16. Emission spectra of 4b after addition of 20 equiv. of different anions recorded in $\mathrm{MeOH}+\mathrm{ACN}(4 \% \mathrm{v} / \mathrm{v})$


Figure S17. Job's plot for $\mathbf{4 a}+F^{-} ;[$receptor $]+[$guest $]=2 \times 10^{-5} \mathrm{M}$


Fig. S18. Job's plot for $\mathbf{4 a}+\mathrm{AcO}^{-} ;[$receptor $]+[$guest $]=2 \times 10^{-5} \mathrm{M}$


Fig. S19. Job's plot for $\mathbf{4 b}+F^{-} ;[$receptor $]+[$guest $]=2 \times 10^{-5} \mathrm{M}$


Fig. S20. Job's plot for $\mathbf{4 b}+\mathrm{AcO}^{-} ;[$receptor $]+[$guest $]=2 \times 10^{-5} \mathrm{M}$



Fig. S21 IR of $\mathbf{4 a}$ only (top) and $\mathbf{4 a}+$ TBAF (bottom)



Fig. S22. IR of 4b only (top) and $\mathbf{4 b}+$ TBAF (bottom)

## Detection Limit Calculation

The limit of detection (LOD) of $\mathbf{4 a}$ and $\mathbf{4 b}$ in absorption as well in emission for the $\mathrm{F}^{-}$ anion was estimated from the following equation

$$
L O D=\frac{k \times \sigma}{\text { slope }}
$$

where $k=3$, and $\sigma$ is standard deviation.
The calibration plot of absorption and emission for the $\mathbf{4 a}$ and $\mathbf{4 b}$ are presented below which provides the value of standard deviation $(\sigma)$ and slope. Thus using the above formula we got the LOD for $\mathrm{F}^{-}$anion in absorption and emission spectra.

LOD of $4 \mathbf{a}: 0.049 \mu \mathrm{M}$ in absorption and $0.030 \mu \mathrm{M}$ in emission.
LOD of $\mathbf{4 b}: 0.042 \mu \mathrm{M}$ in absorption and $0.041 \mu \mathrm{M}$ in emission.



Fig. S23. ${ }^{1} \mathrm{H}$ NMR spectra of $\mathbf{2}$ recorded in $\mathrm{CDCl}_{3}$


Fig. S24. ${ }^{13} \mathrm{C}$ NMR spectra of $\mathbf{2}$ recorded in $\mathrm{CDCl}_{3}$


Fig. S25. ${ }^{1} \mathrm{H}$ NMR spectra of $\mathbf{3}$ recorded in $\mathrm{CDCl}_{3}$


Fig. S26. ${ }^{13} \mathrm{C}$ NMR spectra of $\mathbf{3}$ recorded in $\mathrm{CDCl}_{3}$


Fig. S27. ${ }^{1} \mathrm{H}$ NMR spectra of $\mathbf{4 a}$ recorded in DMSO- $d_{6}$


Fig. S28. ${ }^{13} \mathrm{C}$ NMR spectra of 4a recorded in $\mathrm{CDCl}_{3}$


Fig. S29. ${ }^{1} \mathrm{H}$ NMR spectra of $\mathbf{4 b}$ recorded in DMSO- $d_{6}$


Fig. S30. ${ }^{13} \mathrm{C}$ NMR spectra of $\mathbf{4 b}$ recorded in $\mathrm{CDCl}_{3}$

