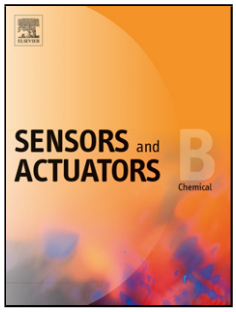

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A new *D–π—A* type Intramolecular charge transfer Dyad System to detect F^- : Anion induced CO_2 sensing

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Graphical abstract

Highlights

ICT fluorescence probe for the detection of F^- anion through ratiometric fluorescence turn-on response and also anion induced CO_2 sensing

Abstract:

A new *D–π—A* type intramolecular charge transfer (ICT) based fluorescence probe have been designed and synthesized by appending imidazole (donor, *D*) and benzothiazole (acceptor, *A*) moieties through a thiophene bridge. The molecular probe upon interaction with different class of anions showed fluorescence *turn-on* behavior to detect fluoride anion (F^-) selectively, in acetonitrile. Job's plot analysis revealed a 1:1 binding stoichiometry between probe and F^- with high binding constant and detection sensitivity (51 nM; 0.092 ppb). Moreover, upon interaction of **1**+F^- with CO_2 the original chromo and fluorogenic behavior of the probe was revived. The change in photophysical behavior and NMR spectroscopic studies suggested about the "*On-Off-On*" type of fluorescence sensing mechanism, involving deprotonation of -*N*H fragment of imidazolyl unit in the presence of F^-.

Key Words: *Chemosensor, ICT, F^-, CO_2*