

# Novel (Thio)urea Compounds for Anions Binding and Transmembrane Transport

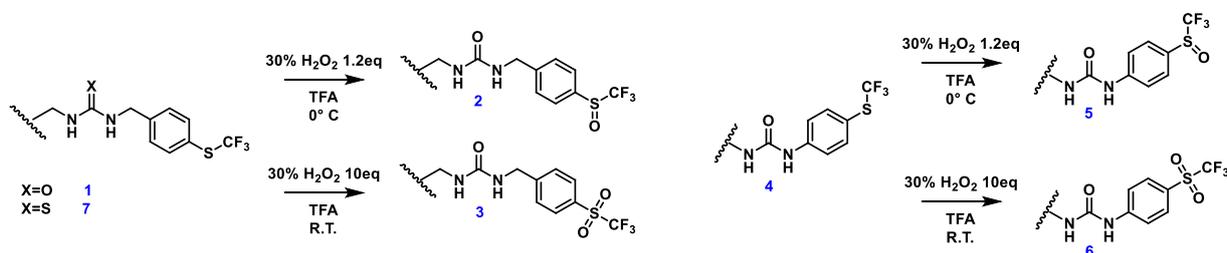
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Ureas have found widespread use in diverse areas of chemistry as anion receptors, sensors, and gelling agents, as well as in the fields of molecular recognition and biological applications such as transmembrane anion transport.<sup>1,2</sup> Many urea applications are possible thanks to their NH groups, which are capable of strong H-bonding interactions. The strength of these interactions could be modulated by the choice of functional groups attached to the nitrogen atoms of ureas. In this work, we decided to explore ureas containing fluorinated substituents, which should show enhanced affinities towards anions and the lipophilicity at the same time.

We synthesized several urea compounds bearing phenyl rings with trifluoromethyl sulfides moieties and their oxidized derivatives. Subsequently, benzyl analogues of the ureas and the corresponding thioureas were also synthesized. Supramolecular properties of these ureas, such as the anion recognition ability, were tested through NMR, UV-vis and ITC techniques. The urea compounds were also investigated for their ability to transport anions through lipophilic membrane using artificial unilamellar vesicles in conjunction with fluorescence spectroscopy. Lucigenin assay was used to monitor the transport of chloride, and the 8-hydroxypyrene-1,3,6-trisulfonate assay was used to monitor changes of pH originating from transport of protons or hydroxide.



1 Busschaert, N.; Kirby, I.L.; Young, S.; Coles, S.J.; Horton, P.N.; Light, M.E. and Gale, P.A. *Angew. Chem. Int. Ed.* **2012**, 51: 4426-4430.

2 Boiocchi, M.; Del Boca, L.; Gómez, D.E.; Fabbrizzi, L.; Licchelli, M. and Monzani, E. *Journal of the American Chemical Society* **2004**, 126 (50), 16507-16514.