

Séminaire PPSM

Jeudi 1er février 2018 - 15h00

Salle de conférences du bâtiment "Pavillon des Jardins"

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Invité par :

«Multidentate Halogen Bonding in Solution»



Halogen bonding is a noncovalent interaction which shares many similarities with hydrogen bonding, but is based on electrophilic halogen substituents, most prominently iodine. Although known for a long time, this interaction has been largely ignored until the 1990s. It is by now established in crystal engineering, and first applications in solution have started to appear in the last years.

Our goal is to develop multidentate halogen bond donors (halogen-based Lewis acids) and to use them in solution. We mainly intend to use these Lewis acids as catalyst in organic transformations, and two such examples are presented in the lecture: polyfluorinated and -iodinated terphenyl and quadphenyl derivatives were synthesized and were applied in an organic reaction which is initiated by the cleavage of a carbon-halogen bond (halide abstraction). Various comparison experiments showed that the observed catalytic activity can indeed be assigned to the action of halogen bonding. In a second example, cationic halogen bond donors based on iodoimidazolium groups were used for the catalytic activation of a carbonyl group.

In parallel, we strive to use multidentate halogen bond donors for molecular recognition processes in solution. A particular focus in these projects is on the use of multipoint interactions. As an example, the three-point halogen bonding interaction between a tridentate halogen bond donor and an orthoamide is presented. Comparison experiments with other amine Lewis basis demonstrate that the association constant of the orthoamide complex is two orders of magnitude higher than those for other, non-fitting analogues. Finally, the molecular recognition of acetone in the gas phase by halogen bonding is discussed.

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