

Synthesis and reactivity of boronic derivatives of ferrocene

Boronic acids and their derivatives constitute an immensely important group of chemical compounds, owing first of all to their very broad scope of applications: from organic synthesis, through analytical and materials chemistry, to medicinal chemistry and chemical biology.

The main idea behind this project is to **push the field of boronic compounds even further, combining their attractive features with the rich chemistry of ferrocene - an organometallic compound of iron.** We plan to synthesize, characterize and investigate the properties of novel boronic derivatives of ferrocene.

Our main aims will be to gain knowledge and skills in preparation of the title compounds and get to know their selected properties to better understand their chemistry and rationalize the design of new derivatives. We would also like to find out what factors are important for synthetic modifications of ferroceneboronic compounds to proceed efficiently and selectively. Basic research on their selected properties will give us hints for the usability of specific derivatives in future applications.

The herein proposed basic research on novel boronic ferrocenes may give us a possibility **to develop a new class of redox-active molecules for potential applications as molecular receptors and/or medicinal agents.**

The search for molecular receptors - compounds with an ability to selectively bind the molecules of analytical interest - is an important, vivid and continuously expanding field of research, involving several branches of chemistry. Organic and organometallic syntheses deliver the receptor molecules, a variety of physicochemical methods are employed to evaluate them in terms of binding potency, selectivity, and mechanism, and finally analytical, materials and biological chemists can take advantage of the receptors' properties to employ them in relevant application settings. The analytes - substances of analytical interest - include chemicals significant from the point of view of medicine, biology, environmental studies, food industry and any other fields relying on the results of chemical analyses. This brings about an unceasing need for the development of novel molecular receptors. Concerning bioactive agents, new chemical entities for effective use in medicine have nowadays become even more important than ever before. This takes place primarily due to such alarming phenomena as the development of microbes' resistance to hitherto used pharmaceuticals and considerably slowed development of novel therapeutics, as well as the essential efforts to increase the drugs' selectivity action and concurrently limit their toxic effects.

The economic and societal impact is represented primarily by the potential fields of application of the title compounds. The development of medicine or materials science has already been and is still anticipated to be of very high importance to improve the quality of people's lives, and chemistry contributes to this improvement tremendously.