

Synthesizing Tailor-Made Materials from Molecular Fragment Ions

Initiative: Freigeist-Fellowships

Bewilligung: 01.07.2019

Laufzeit: 5 Jahre

Projekt-Website: <https://woi.chemie.uni-leipzig.de/start/nfg-dr-warneke/>

Developing strategies to transform available molecular building blocks into a compound with desired properties is the principal mission of chemical research. Wouldn't it be superb if one could just make molecules like LEGO structures? Imagine taking a stable molecule and splitting it by breaking a specific bond as if it were a ball and stick model known from school classes. Next, connect one of the fragments, which is likely very reactive, to another molecule to form the substance of choice. Unfortunately, the specific cleavage of strong bonds, the stabilization of formed fragments and controlled bond formation are extremely challenging using classical chemistry methods. In contrast, thousands of highly reactive charged molecular fragments are formed in a controlled manner in analytical instruments known as mass spectrometers. However, they are rarely used in chemical synthesis. We will explore how "traditionally unsynthesizable" molecular fragments may be used as building blocks for the preparation of valuable compounds. Recently developed technology and chemical methods to stabilize charged fragments enable us to take molecular fragments out of mass spectrometers and selectively attach them to other molecules. The method will be developed for the generation of anti-cancer drug prototypes and functional materials which cannot be synthesized using conventional approaches.

Projektbeteiligte

Dr. Jonas Warneke

Universität Leipzig

Wilhelm-Ostwald-Institut für Physikalische und

Theoretische Chemie

Leipzig