Chemists allow boron atoms to migrate

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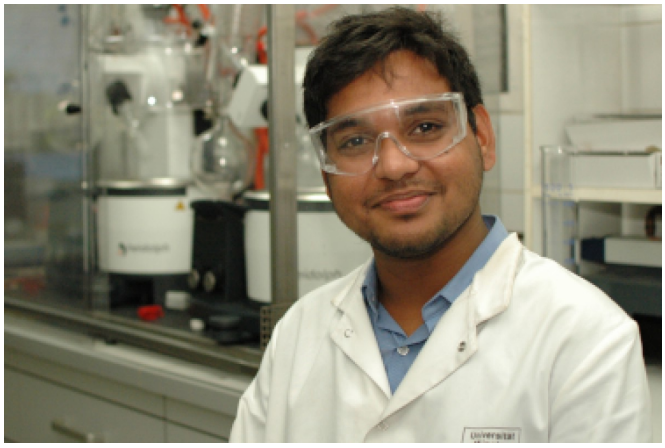

Study author Kalipada Jana. Credit: University of Münster

Organic molecules with atoms of the semi-metal boron are among the most important building blocks for synthesis products that are needed to produce drugs and agricultural chemicals. However, during the usual chemical reactions used in industry, the valuable boron unit, which can replace another atom in a molecule, is often lost. Chemists at the University of Münster have now succeeded in significantly expanding the range of applications of commercially and industrially used boron compounds, so-called allylboronic esters. The study has been published in the scientific journal *Chem*.

Since so-called boronic acid derivatives are very versatile and reliably applicable in their variants, chemists often use them to build up important carbon-carbon couplings (C-C couplings). The most important process using boronic acid derivatives is the Nobel Prize-winning Suzuki-Miyaura coupling. Also widely used in synthesis are the so-called allylboronic esters, which also belong to this class of boron compounds.

In their current study, the chemists headed by Prof. Armido Studer of the Organic Chemical Institute at Münster University are now presenting C-C couplings in which the boron unit from the starting material is retained in the product. The scientists use methods of so-called radical chemistry for this purpose. The principle works like this: The boron unit "migrates" from one carbon atom to the neighbouring atom, thus enabling a second C-C coupling.

Using this method, the chemists can gradually incorporate individual building blocks of molecules at different points in the basic structure. "Since the boron unit remains in the product molecule, i.e. is 'preserved,' it can be replaced by another molecular unit, which can be done using the entire spectrum of industrial methods. The commercially available allylboronic esters thus appear in a new guise," says Armido Studer, the lead author of the study. The new method may in future be relevant for the production of drugs. In the future, the new method may be relevant for the production of pharmaceuticals, among other things.

More information: Kalipada Jana et al, Radical 1,3-Difunctionalization of Allylboronic Esters with Concomitant 1,2-Boron Shift, *Chem* (2020). DOI: 10.1016/j.chempr.2019.12.022

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