

Environmentally Friendly Synthesis of Quinoxalines

TU Wien researchers developed a fast, environmentally friendly synthesis of quinoxalines in high-temperature water without the need of any catalysts or other additives. Quinoxalines are used in various fields of application: in organic electronics, as dyes for colouring purposes, in cell staining processes, as antibiotics, herbicides, and pharmaceuticals.

BACKGROUND

There is a huge variety of synthetic routes for the synthesis of functionalized quinoxalines. However, most of these show numerous disadvantages, such as the use of expensive and partly toxic, organic or inorganic catalysts, the use of organic solvents, and long reaction times. In the near future such harmful chemical processes will be increasingly restricted or even banned. Therefore, the search for environmentally friendly and less toxic chemical syntheses solves an increasingly pressing problem.



FURTHER READING

A novel synthesis of quinoxalines has been developed using superheated (oder pressurized hot) water, without the need of any catalysts or other additives, and with very short reaction times.

The reaction takes place in a microwave reactor set-up for hydrothermal reactions or in a steel autoclave. After heating to the hydrothermal regime of water, the transformation into the corresponding quinoxaline takes place. After a specific reaction time, the reaction mixture is cooled down again to room temperature. Since the apolar organic quinoxaline products are only slightly hydrophilic or not hydrophilic at all, they phase-separate from water during cooling and can be collected by filtration.

BENEFITS

- synthesis in high temperature water
- no use of any organic solvents
- no use of catalysts
- faster than conventional synthesis

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APPLICATIONS:

antibiotics, herbicides, insecticides, pharmaceuticals, cell stains, reactive dyes and pigments, optoelectronic materials

DEVELOPMENT STATUS:

Proof of Concept

KEYWORDS:

quinoxaline, hydrothermal synthesis, environmentally friendly

IPR:

Patent pending

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