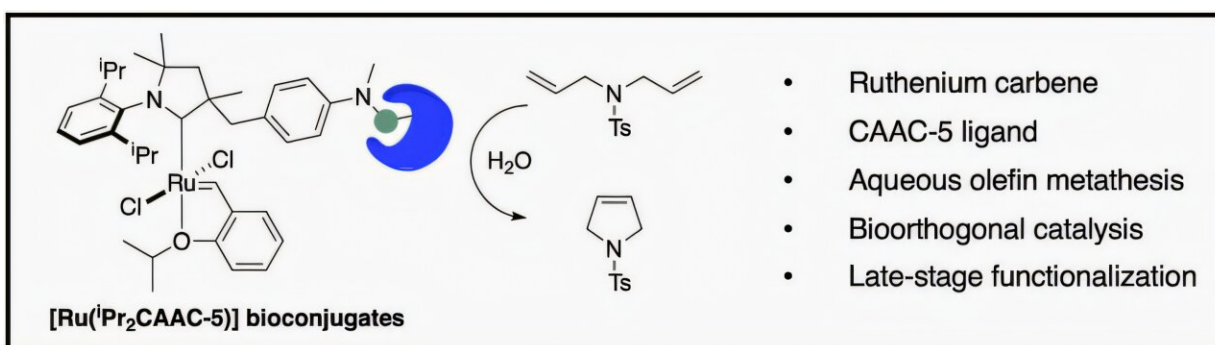


Water-stable catalyst could bring carbon-bond chemistry closer to use in living cells

September 28 2026



Credit: *Angewandte Chemie International Edition* (2026). DOI: 10.1002/anie.3685338

Olefin metathesis is one of the most important reactions in organic chemistry for forming carbon–carbon bonds—for example, in the production of pharmaceuticals, plastics and complex natural products. However, previous ruthenium catalysts that enable this reaction have faced a major challenge: They rapidly degrade in aqueous or biological environments, making their use in natural systems such as cells or blood extremely difficult.

A team of researchers from the Swiss Nanoscience Institute and the Department of Chemistry at the University of Basel has developed a new approach: a ruthenium catalyst featuring a specifically tailored ligand, a

cyclic (alkyl)(amino) carbene (CAAC). Their findings were recently [published](#) in *Angewandte Chemie International Edition*.

"The new catalyst is not only significantly more stable in water but can also be selectively attached to biomolecules," explains Damian Graf, first author of the publication and a doctoral student at the SNI Ph.D. School.

Thanks to an integrated aniline group, the catalyst can be coupled to proteins or peptides. This allows it to remain active for longer—with up to 600 reaction cycles—and enables its targeted use in biological systems.

The advance paves the way for applications in which chemical reactions could take place directly in living organisms without harming them. Olefin metathesis is moving one step closer to becoming a useful tool in chemical biology and medicine.

More information: Damian Alexander Graf et al, A Ruthenium(CAAC-5) Olefin Metathesis Catalyst for Bioconjugation, *Angewandte Chemie International Edition* (2026). [DOI: 10.1002/anie.3685338](#)

Provided by University of Basel

Citation: Water-stable catalyst could bring carbon-bond chemistry closer to use in living cells (2026, September 28) retrieved 29 September 2026 from <https://phys.org/news/2026-09-stable-catalyst-carbon-bond-chemistry.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.
