

lädt ein

gemeinsam mit der Gesellschaft
Deutscher Chemiker
zum

Vortrag

von Herrn

**Prof. Dr. Christopher
Barner-Kowollik**

Institut für Funktionelle
Grenzflächen

**Karlsruher Institut für
Technologie (KIT)**



“Wavelength- Resolved Photochemical Reactivity”

am: 17. Dezember 2026

um: 09:30 Uhr

WO: im Raum A12.232

Gäste sind herzlich willkommen!



TECHNISCHE UNIVERSITÄT
IN DER KULTURHAUPTSTADT EUROPAS
CHEMNITZ

Prof. Dr. Michael Sommer

Telefon: 0371 / 531 32507

E-Mail: michael.sommer@chemie.tu-chemnitz.de

**Prof. Dr. Christopher
Barner-Kowollik**
Institut für Funktionelle
Grenzflächen
**Karlsruher Institut für
Technologie (KIT)**



“Wavelength-Resolved Photochemical Reactivity”

When selecting a light source for a photochemical process, we often assume that photon absorption probability at a given wavelength predicts reaction efficiency under different colors of light. Over the past decade, this assumption has been challenged, as mismatches between absorption spectra and wavelength-resolved reactivity appear across many systems. Here, we examine the mechanisms behind this mismatch in photocycloadditions and photopolymerizations and explore wavelength's role in light-driven 3D printing. For small-molecule cycloadditions, we show how a chromophore's microenvironment can shift energy levels, lowering the excitation energy needed and enabling reaction at the red edge of the absorption spectrum. For photopolymerization, we show that primary radical lifetime varies with excitation wavelength, modelling this as wavelength-dependent termination rates. The resulting predictions match experimental data well. We also discuss other sources of this dependence and ways to separate photokinetic from photophysical effects.

References

- Walden, S. L.; Carroll, J. A.; Unterreiner, A.-N.; Barner-Kowollik, C. *Adv. Sci.* **2024**, *11*, 2306014.
Irshadeen, I.M.; Walden, S.L.; Wegener, M.; Truong, V.X.; Frisch, H.; Blinco, J.P.; Barner-Kowollik, C. *J. Am. Chem. Soc.* **2021**, *143*, 21113-21126.
Carrol, J. A.; Pashley-Johnson, F.; Klein, M.; Stephan, T.; Pandey, A. K.; Walter, M.; Unterreiner, A. N.; Barner-Kowollik, C. *J. Am. Chem. Soc.* **2025**, *147*, 26643-26651.
Pashley-Johnson, F.; Wu, X.; Carroll, J. A.; Walden, S. L.; Frisch, H.; Unterreiner, A. N.; Du Prez, F. E.; Wagenknecht, H. A.; De Alaniz, J. R.; Feringa, B. L.; Heckel, A.; Barner-Kowollik, C. *Angew. Chem. Int. Ed.* **2025**, *64*, e202502651.
Smith, M.-P.; Sbordone, F.; Recker, E. A.; Page, Z. A.; Barner-Kowollik, C. *J. Am. Chem. Soc.* **2026**, *148*, 29585–29597.

