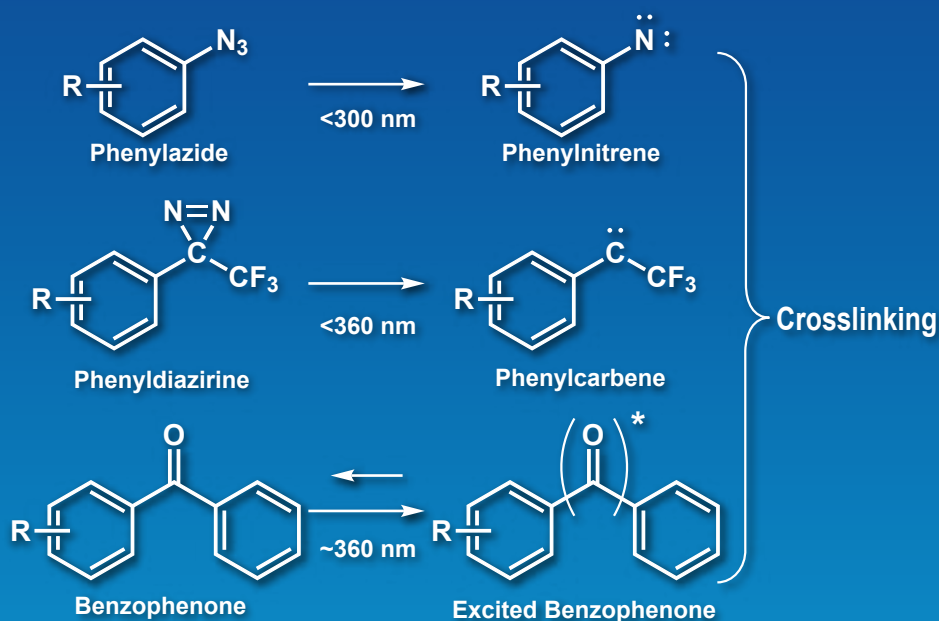


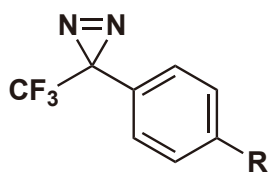


Photo-reactive Crosslinkers



Some functional groups can be induced to react with target molecules by exposure to UV light. Photoreactive groups such as azides and diazirines are readily decomposed by UV light irradiation, resulting in highly reactive intermediates and the formation of covalent bonds with neighboring molecules. Within the context of molecular biology, photoaffinity labeling has prolific use in preparing ligands with photo-reactive units enabling the direct probing of target proteins.

Diazirines



Diazirines generates a carbene unit by UV irradiation (<360 nm). Carbenes can crosslink by short-time irradiation due to higher reactivity than nitrenes. Carbenes react with water when neighboring target molecules are absent, and thus do not lead to non-specific crosslinking.

R = CH₂OH

R = CH₂Br

R = COOH

R = CH₂NH₂·HCl

4-[3-(Trifluoromethyl)-3H-diazirin-3-yl]benzyl Alcohol

200mg / 1g [T2818]

4-[3-(Trifluoromethyl)-3H-diazirin-3-yl]benzyl Bromide

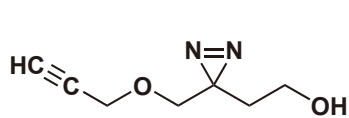
200mg / 1g [T2819]

4-[3-(Trifluoromethyl)-3H-diazirin-3-yl]benzoic Acid

200mg / 1g [T2820]

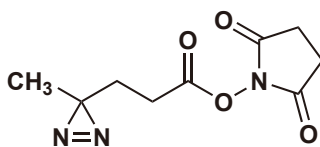
4-[3-(Trifluoromethyl)-3H-diazirin-3-yl]benzylamine Hydrochloride

200mg / 1g [T3448]



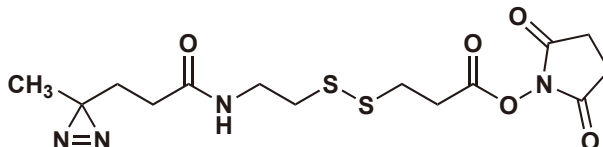
3-[(2-Propyn-1-yloxy)methyl]-3H-diazirine-3-ethanol

100mg [P2843]



NHS-Diazirine

10mg [D5761]



NHS-SS-Diazirine

10mg [D5887]

Applications

Reviews

T. Tomohiro, M. Hashimoto, Y. Hatanaka, *Chem. Record* **2005**, 5, 385. <https://doi.org/10.1002/tcr.20058>

M. Hashimoto, Y. Hatanaka, *Eur. J. Org. Chem.* **2008**, 2513. <https://doi.org/10.1002/ejoc.200701069>

Photoaffinity labeling

Y. Kashiwayama, et al., *J. Biol. Chem.* **2010**, 285, 26315. <https://doi.org/10.1074/jbc.M110.104547>

E. W. S. Chan et al., *J. Am. Chem. Soc.* **2004**, 126, 14435. <https://doi.org/10.1021/ja047044i>

K. Matsuda et al., *Biosci. Biotechnol. Biochem.* **2001**, 65, 1534. <https://doi.org/10.1271/bbb.65.1534>

M. Wiegand, T. K. Lindhorst, *Eur. J. Org. Chem.* **2006**, 4841. <https://doi.org/10.1002/ejoc.200600449>

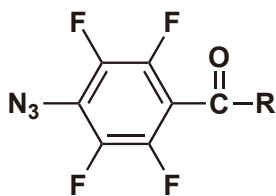
Photoaffinity microarray

D. M. Dankbar, G. Gauglitz, *Anal. Bioanal. Chem.* **2006**, 386, 1967. <https://doi.org/10.1007/s00216-006-0871-x>

S. Wei et al., *Chem. Lett.* **2006**, 35, 1172. <https://doi.org/10.1246/cl.2006.1172>

N. Kanoh et al., *Angew. Chem. Int. Ed.* **2003**, 42, 5584. <https://doi.org/10.1002/anie.200352164>

Phenylazides



Phenylazide generates a nitrene by UV irradiation (<300 nm). It is noted that azido groups tend to have less harmful effect on target analyte. Activation of the nitrene requires a shorter wavelength of UV light, and potential protein denaturation during long-period irradiation should be taken into consideration.

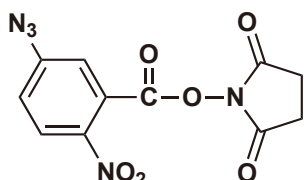
R = OH
R = NHS

4-Azido-2,3,5,6-tetrafluorobenzoic Acid

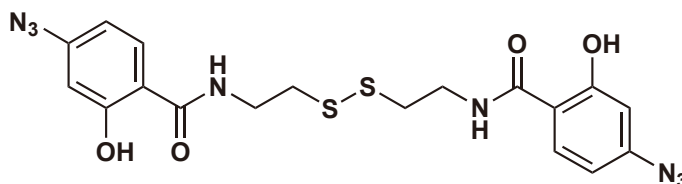
1g [A2674]

4-Azido-2,3,5,6-tetrafluorobenzoic Acid N-Succinimidyl Ester

200mg / 1g [S0952]



5-Azido-2-nitrobenzoic Acid
N-Succinimidyl Ester
10mg [S0860]



Bis[2-(4-azidosalicylamido)ethyl]
Disulfide
10mg [B3790]

Applications

Photoaffinity labeling

J. F. W. Keana, S. Xiong Cai, *J. Org. Chem.* **1990**, 55, 3640. <https://doi.org/10.1021/jo00298a048>

Photoaffinity microarray

M. Thust et al., *Anal. Chim. Acta* **1996**, 323, 115. [https://doi.org/10.1016/0003-2670\(95\)00619-2](https://doi.org/10.1016/0003-2670(95)00619-2)

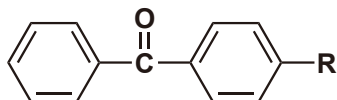
Photo-crosslinking of protein complex

J. Rappsilber et al., *Anal. Chem.* **2000**, 72, 267. <https://doi.org/10.1021/ac991081o>

Photo-modification of carbon nanotube surface

S. J. Pastine et al., *J. Am. Chem. Soc.* **2008**, 130, 4238. <https://doi.org/10.1021/ja8003446>

Benzophenones



Benzophenones excited by UV irradiation (near 360 nm) induce hydrogen abstraction from target molecules. The reaction efficiency remains high despite this due to the reverseability of the excited state. Additionally, photoexcited benzophenones is not water-reactive.

R = COOH
R = CO-NHS
R = maleimide
R = NH₂

4-Benzoylbenzoic Acid

5g / 25g [B1164]

4-Benzoylbenzoic Acid N-Succinimidyl Ester

200mg / 1g [S0863]

4-(N-Maleimido)benzophenone

50mg / 250mg [M3259]

4-Aminobenzophenone

5g / 25g [A1140]

Applications

Photoaffinity labeling

G. F. Ross et al., *Bioconjugate Chem.* **2003**, 14, 962. <https://doi.org/10.1021/bc034050f>

Y. Jung et al., *Anal. Chem.* **2009**, 81, 936. <https://doi.org/10.1021/ac8014565>

Photoaffinity microarray

A. J. Hughes, A. E. Herr, *Proc. Natl. Acad. Sci. USA* **2012**, 109, 21450. <https://doi.org/10.1073/pnas.1207754110>

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