

**B.Sc. Semester-VI
Group-A / DSE-4
Organic Synthesis**



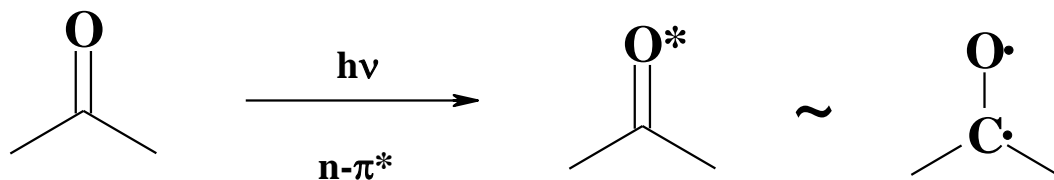
III. Photochemistry

- 3. (a). Electronic Configuration of Reactive States
(b). Cis-Trans Isomerisation of Alkenes**



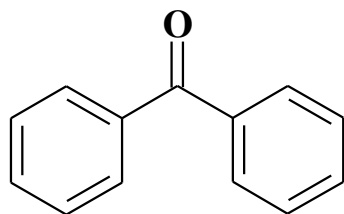
**Dr. Rajeev Ranjan
University Department of Chemistry
Dr. Shyama Prasad Mukherjee University, Ranchi**

Electronic configuration of Reactive states

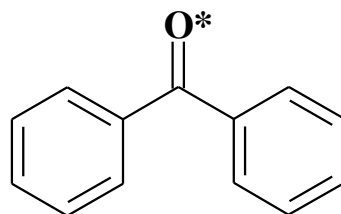


carbonyl chromophore

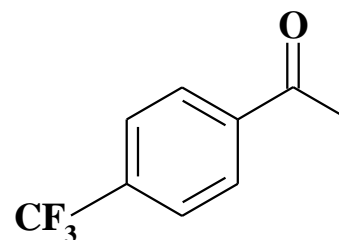
Dipolar species



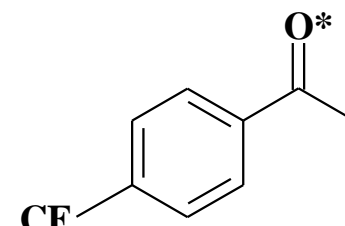
2.9 D
1665 cm^{-1}



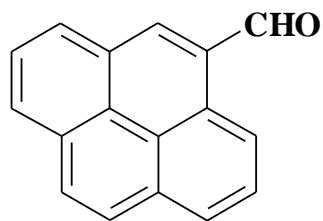
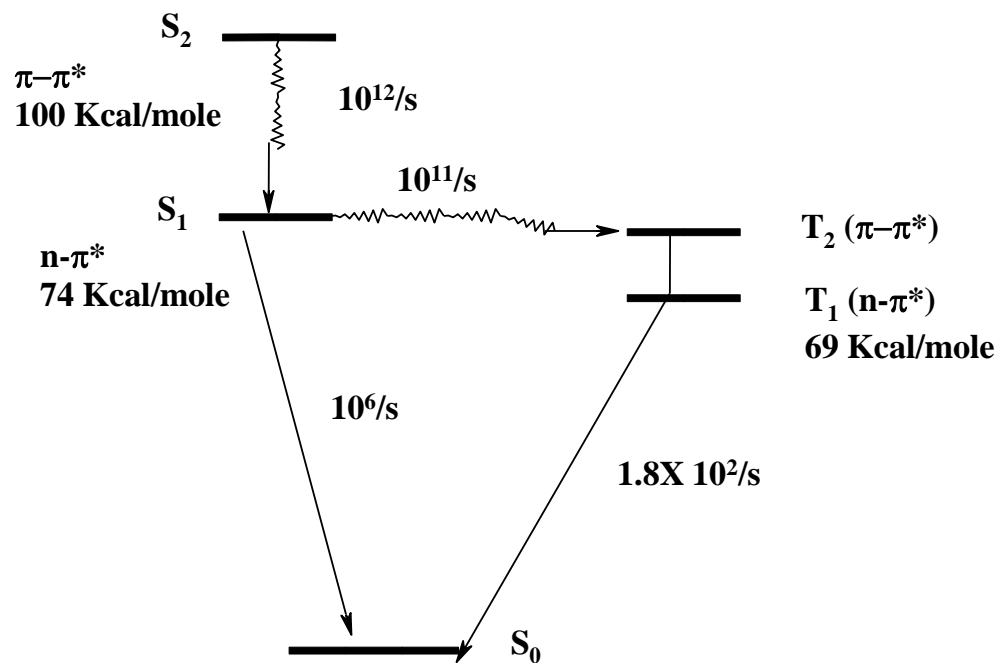
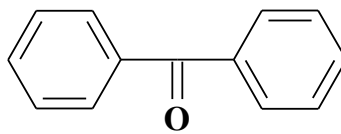
2.1 D
1225 cm^{-1}



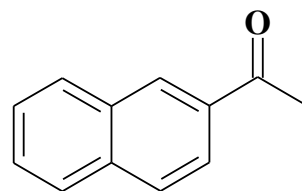
1696 cm^{-1}



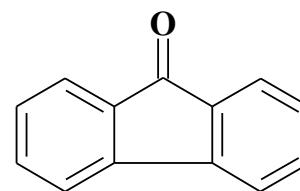
1326 cm^{-1}



pyrene aldehyde



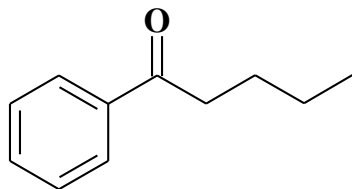
2-acetonaphthone



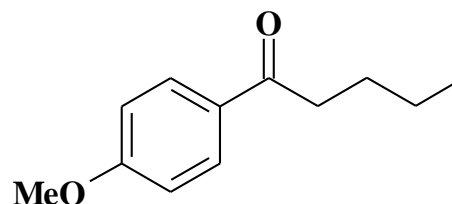
fluorenone

lowest triplet state is $\pi-\pi^*$

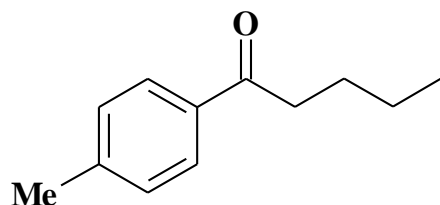
Triplet lifetime depends on the nature of lowest excited states



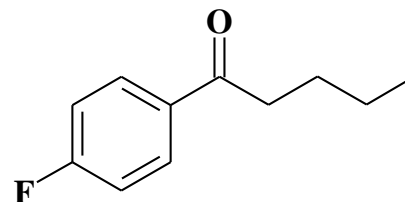
$\tau = 0.0064 \text{ s}, 77^\circ\text{K}$
 $n-\pi^*$



$\tau = 0.45 \text{ s}, 77^\circ\text{K}$
 $\pi-\pi^*$



$\tau = 0.13 \text{ s}, 77^\circ\text{K}$
 $n-\pi^* \text{ \& } \pi-\pi^*$

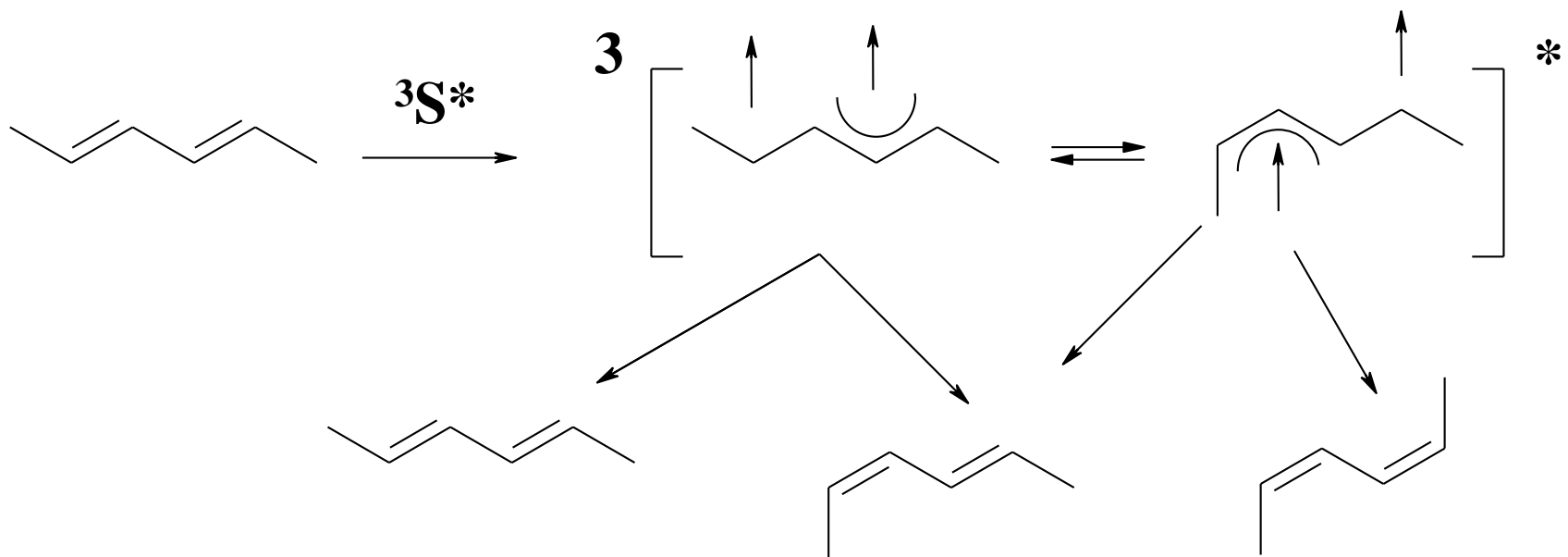
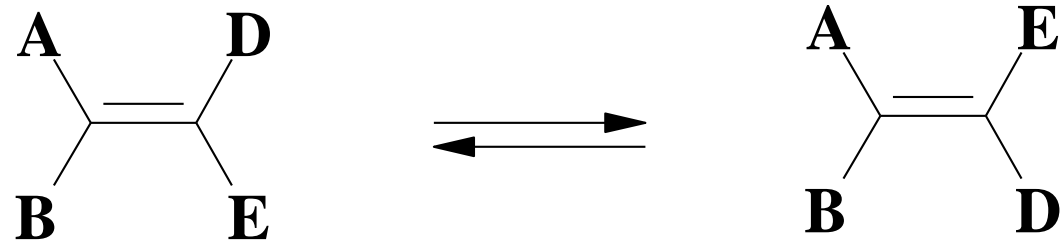


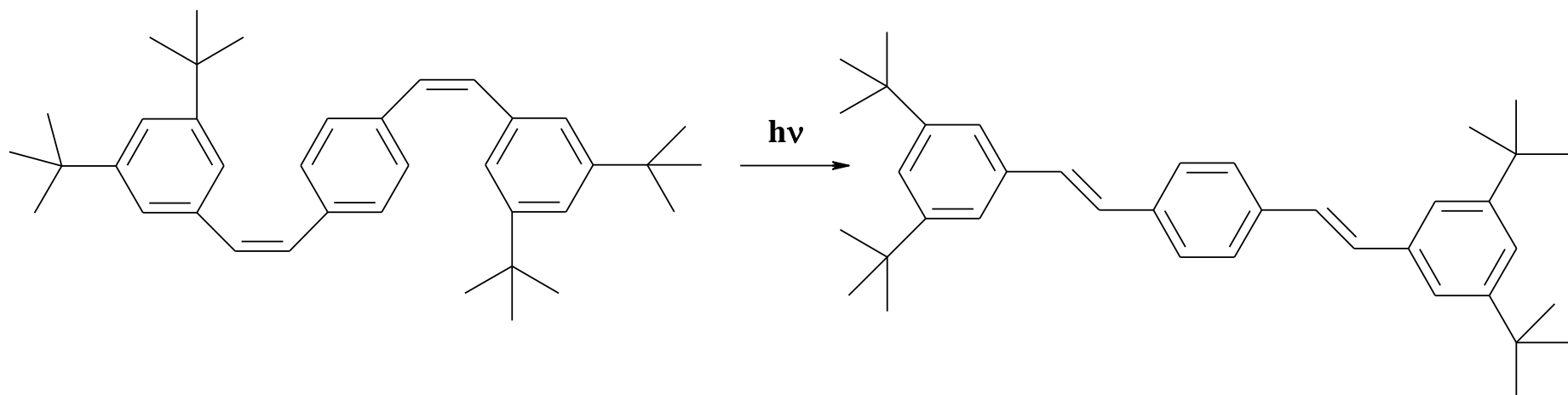
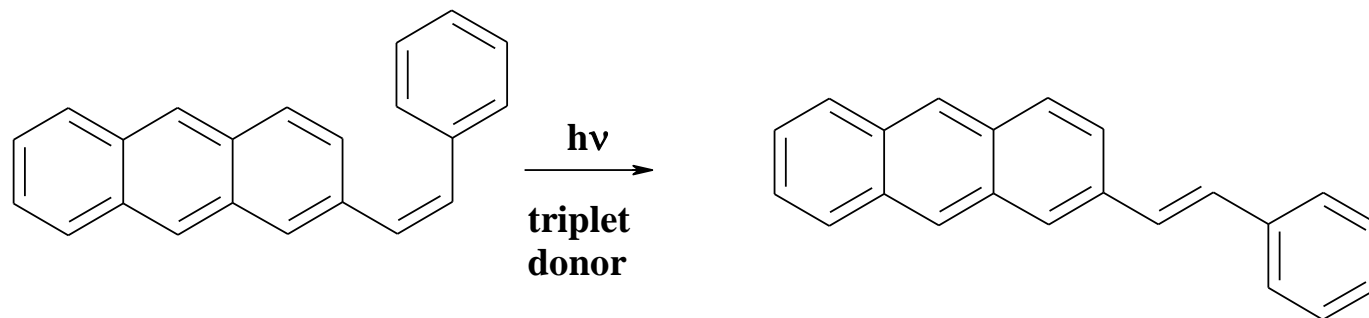
$\tau = 0.039 \text{ s}, 77^\circ\text{K}$
 $n-\pi^* \text{ \& } \pi-\pi^*$

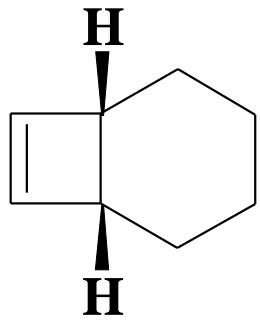
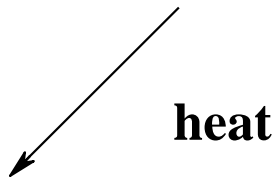
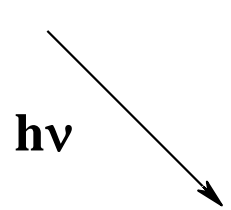
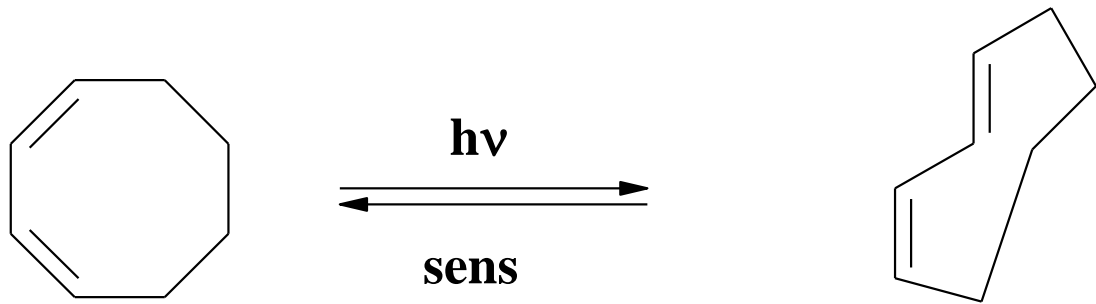
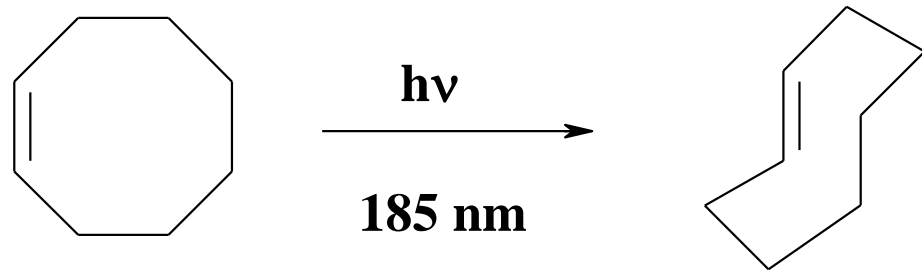
Electron donating substituents such as Me and -OMe stabilize $\pi-\pi^*$ state

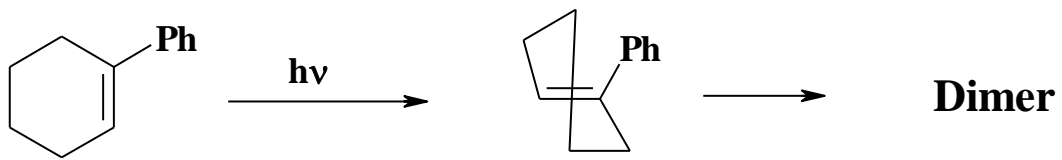
Electron withdrawing substituents such as CF_3 and CN stabilize $n-\pi^*$ state

Cis-Trans isomerization of alkenes

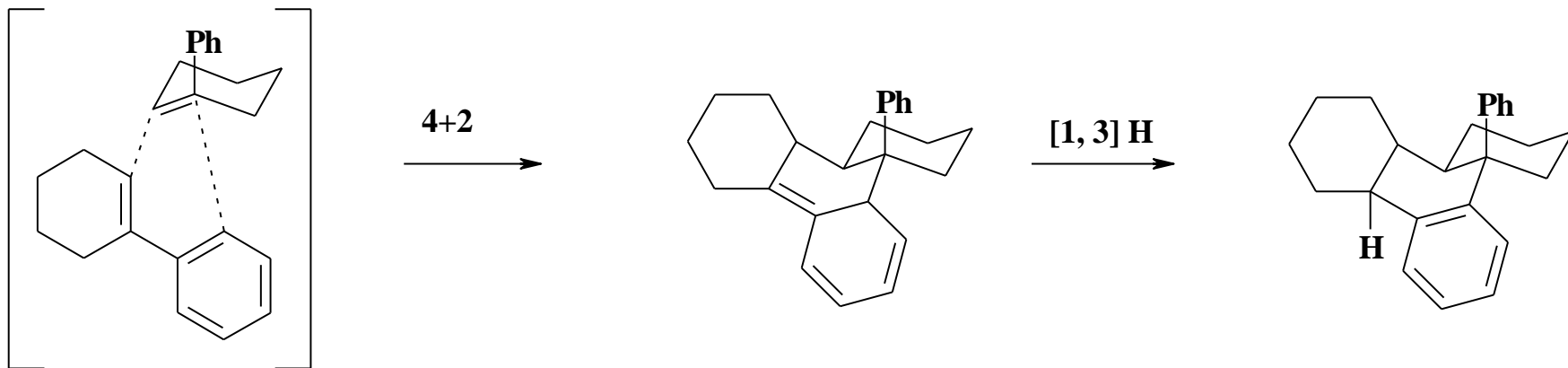




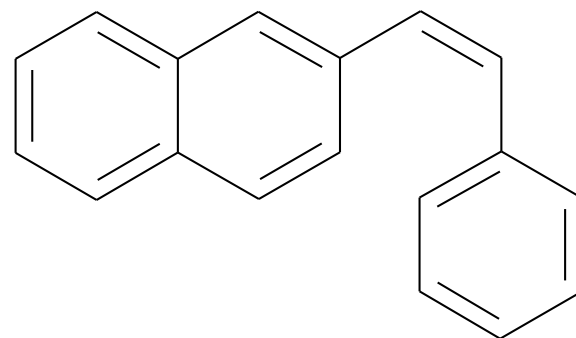
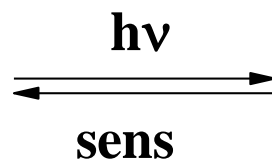
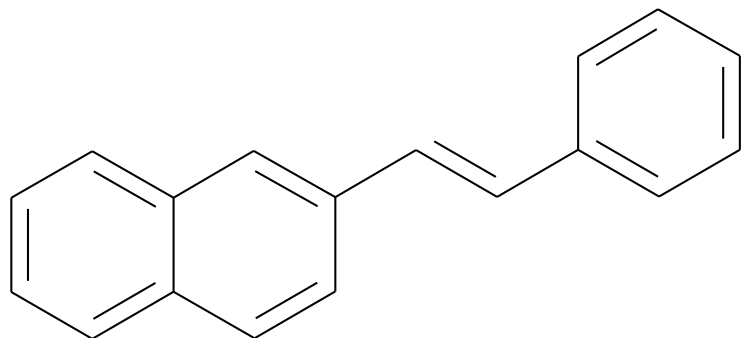
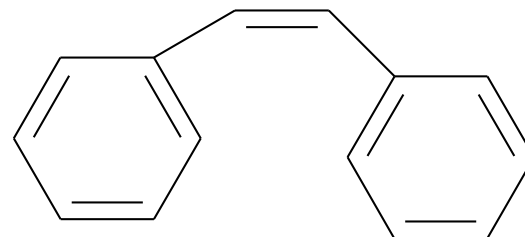
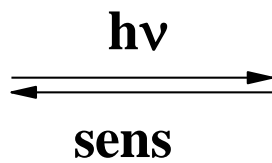
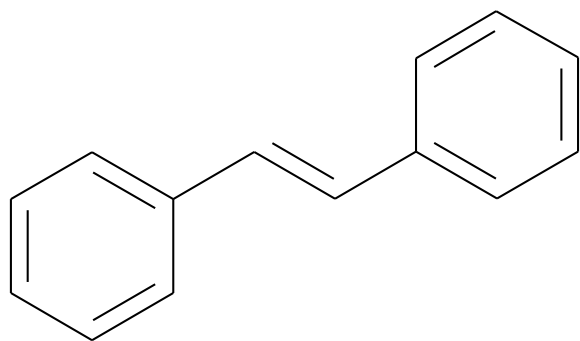


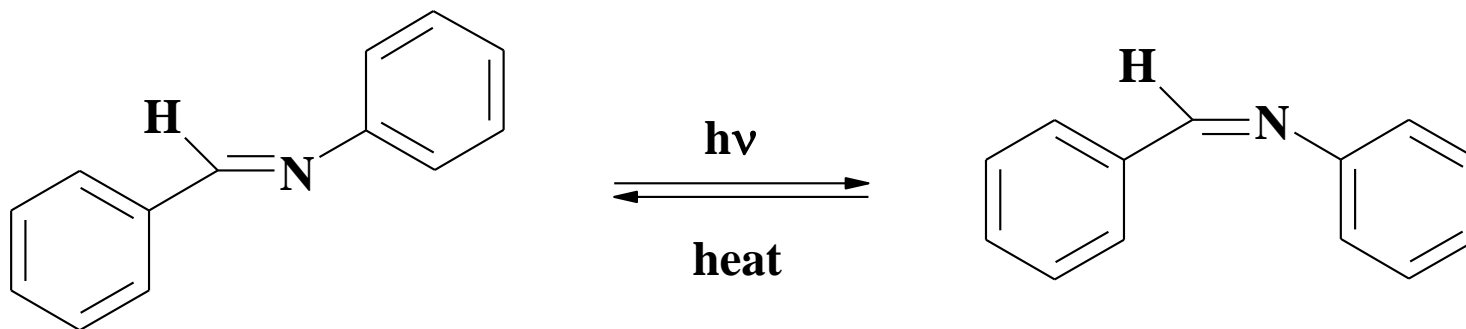
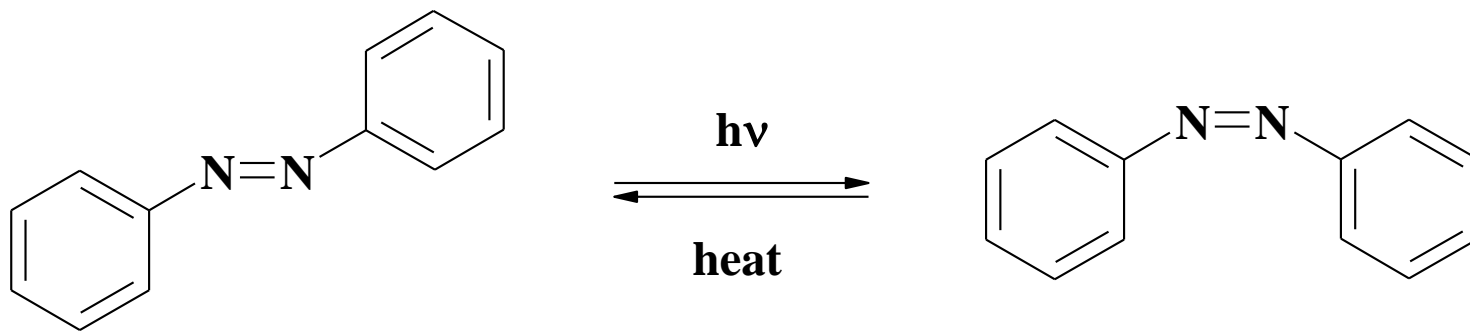
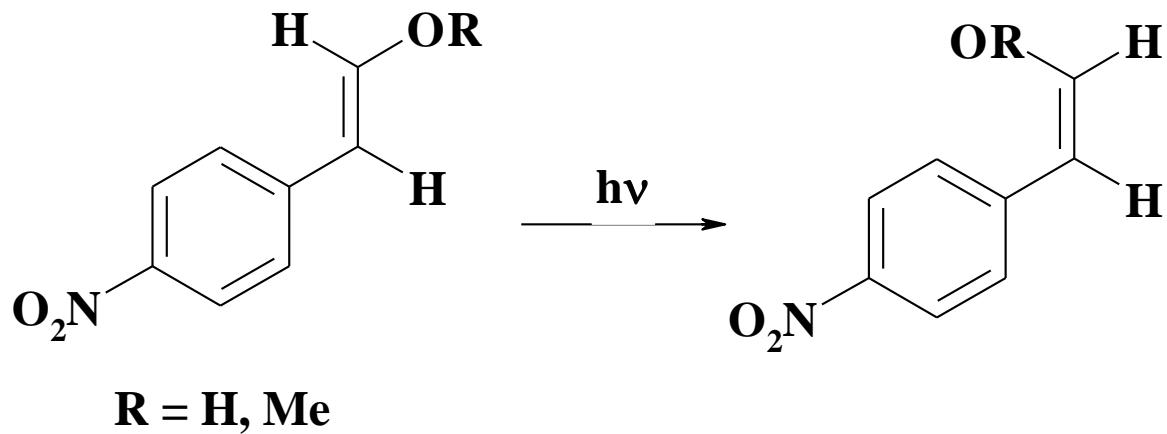


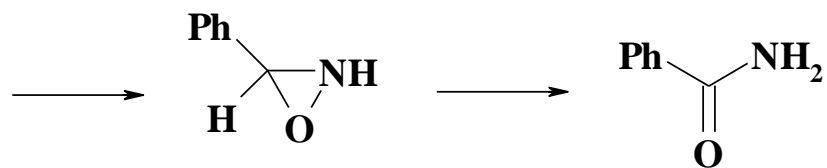
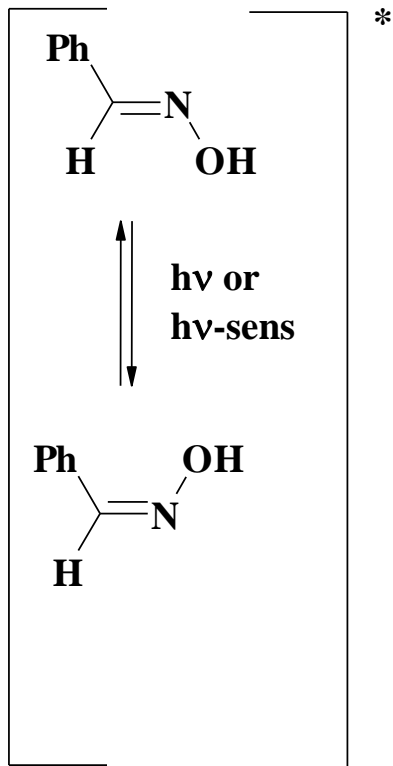
$\lambda_{\text{Max}} = 380 \text{ nm}$
 $\tau = 9 \mu\text{s}$



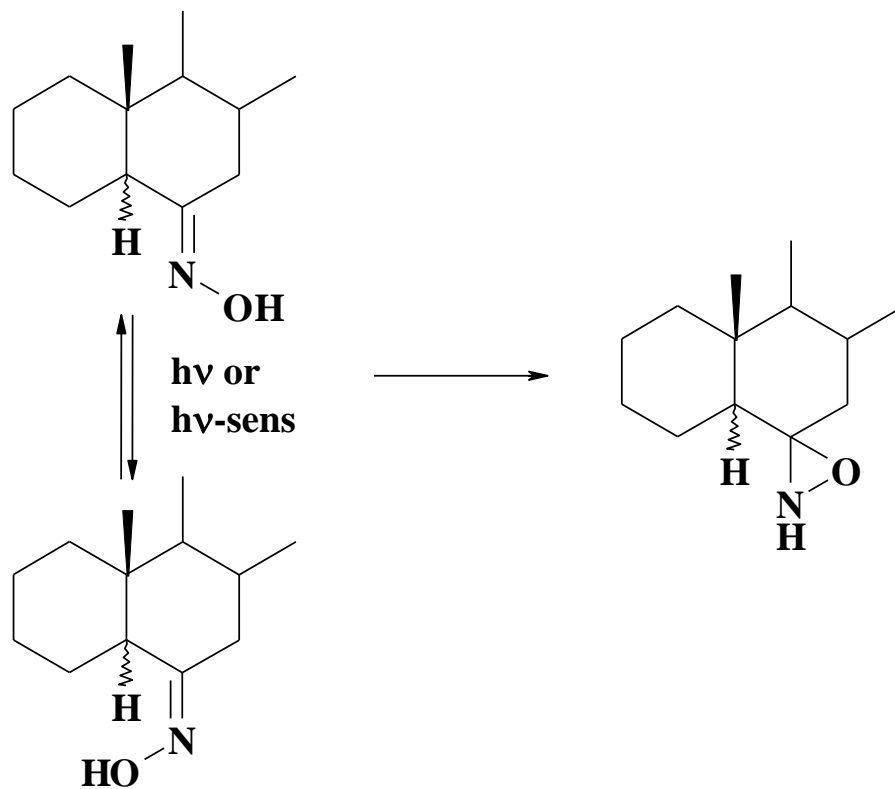
Trapping of a trans cyclohexene

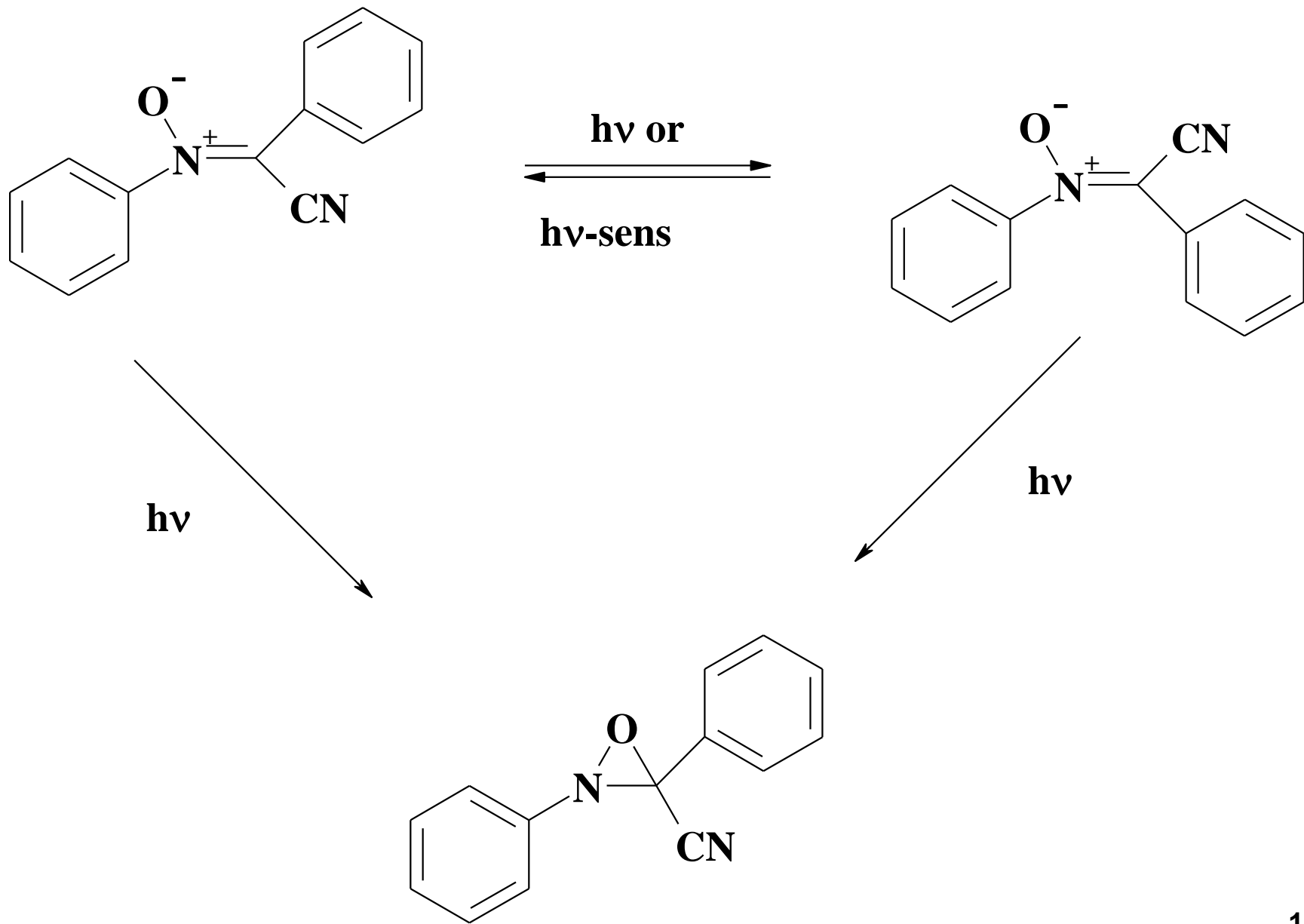


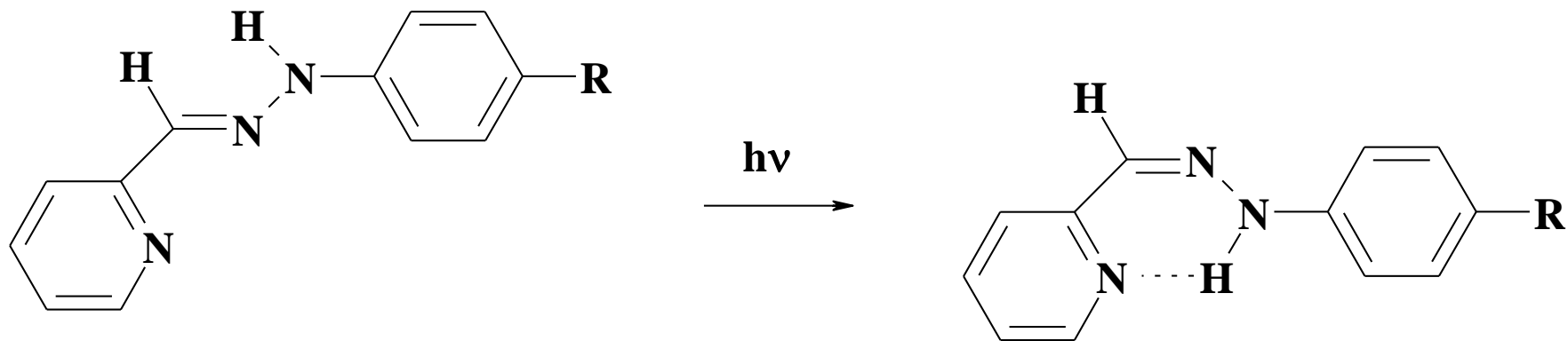
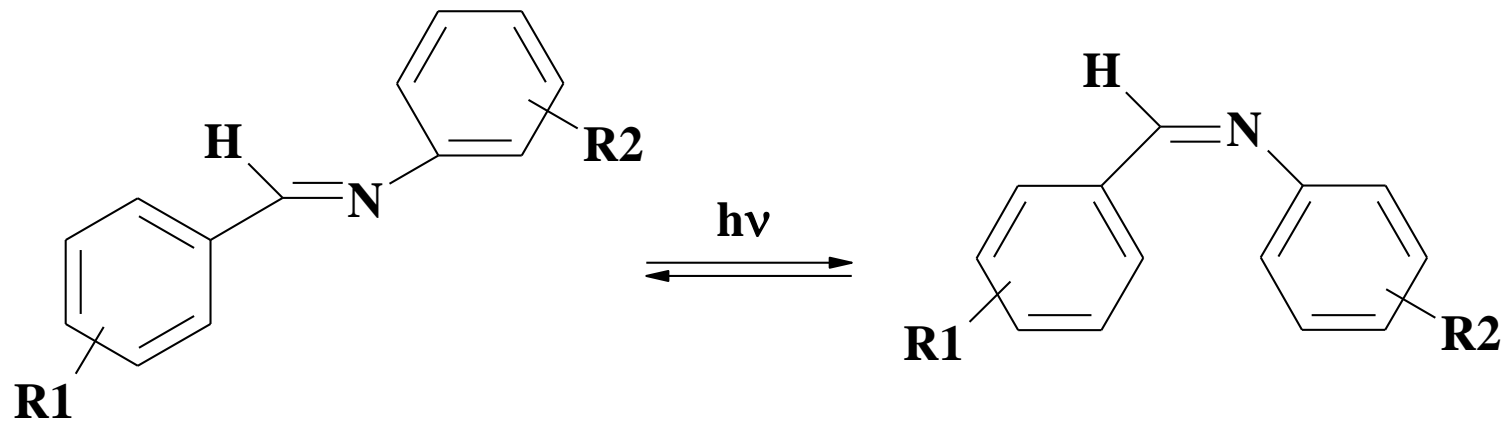


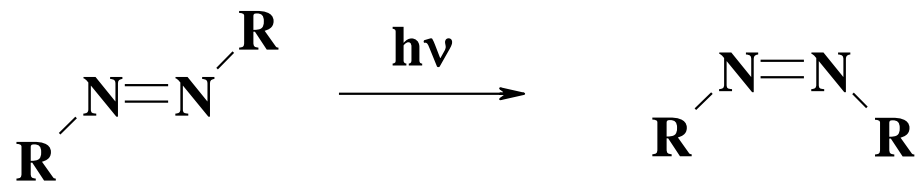


oxaaziridine



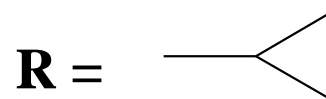
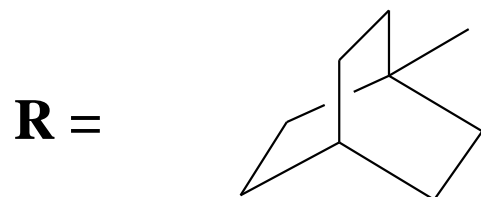
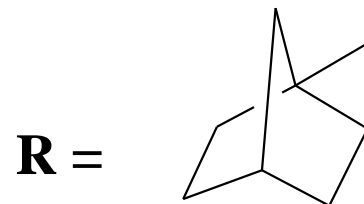
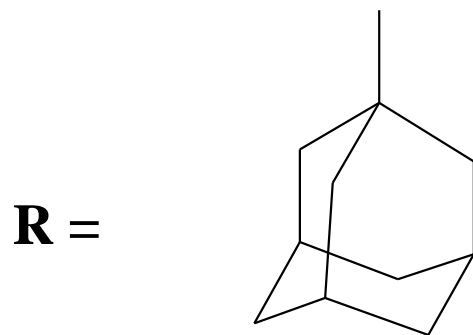


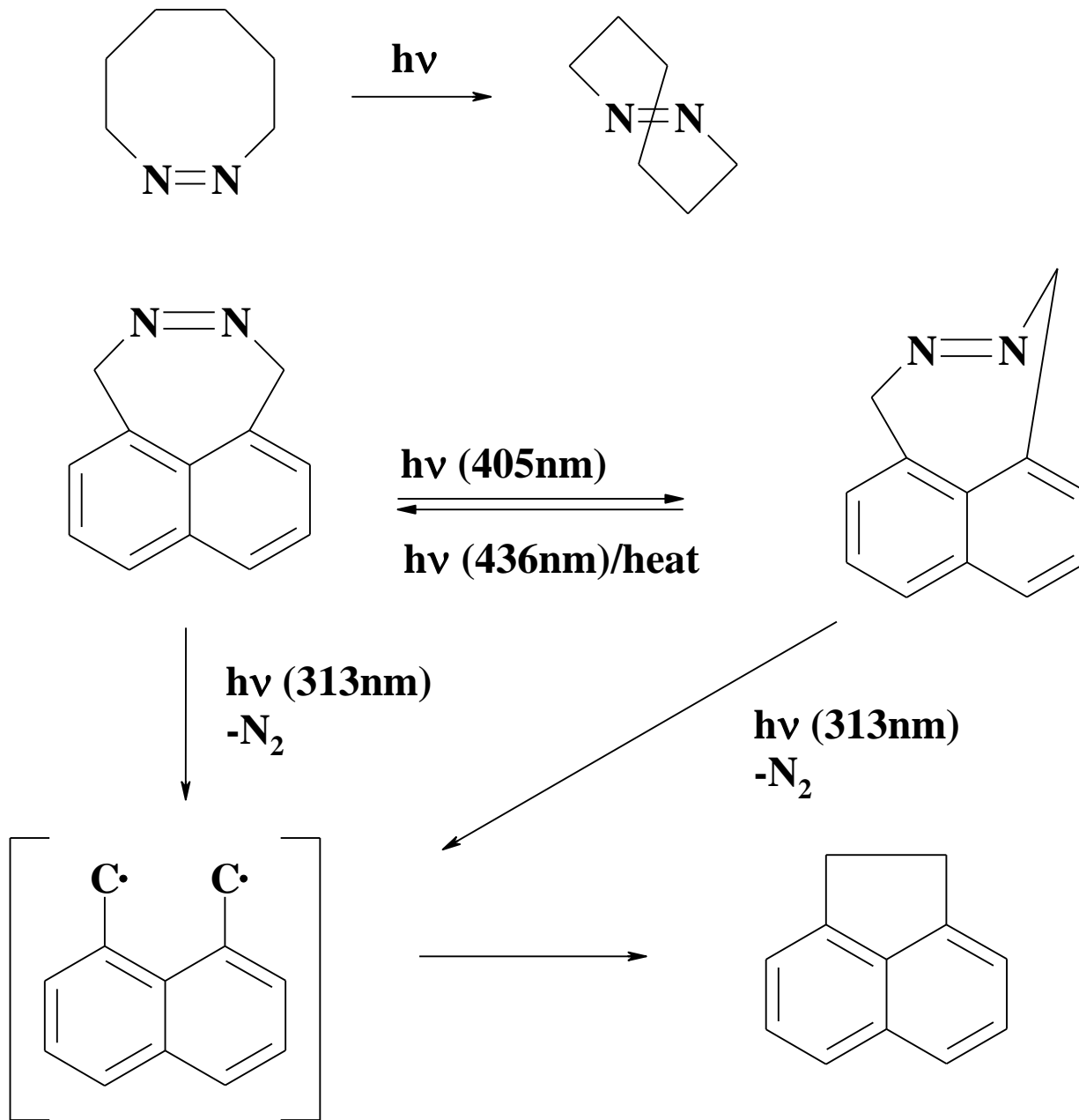


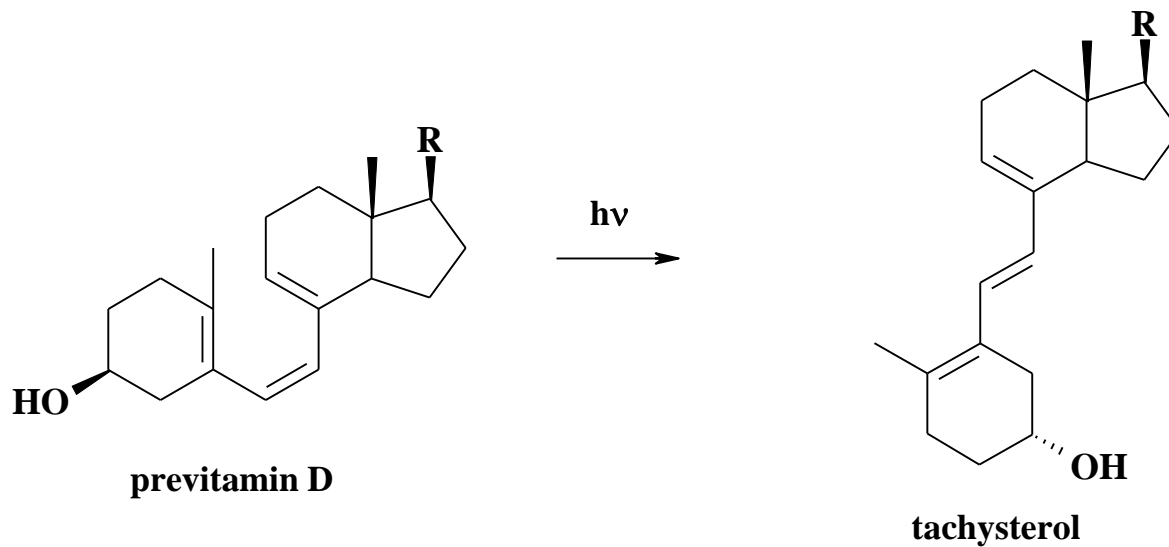
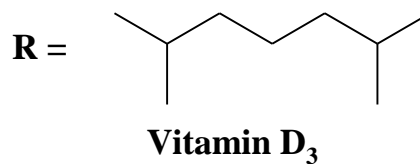
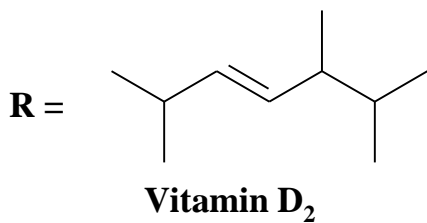
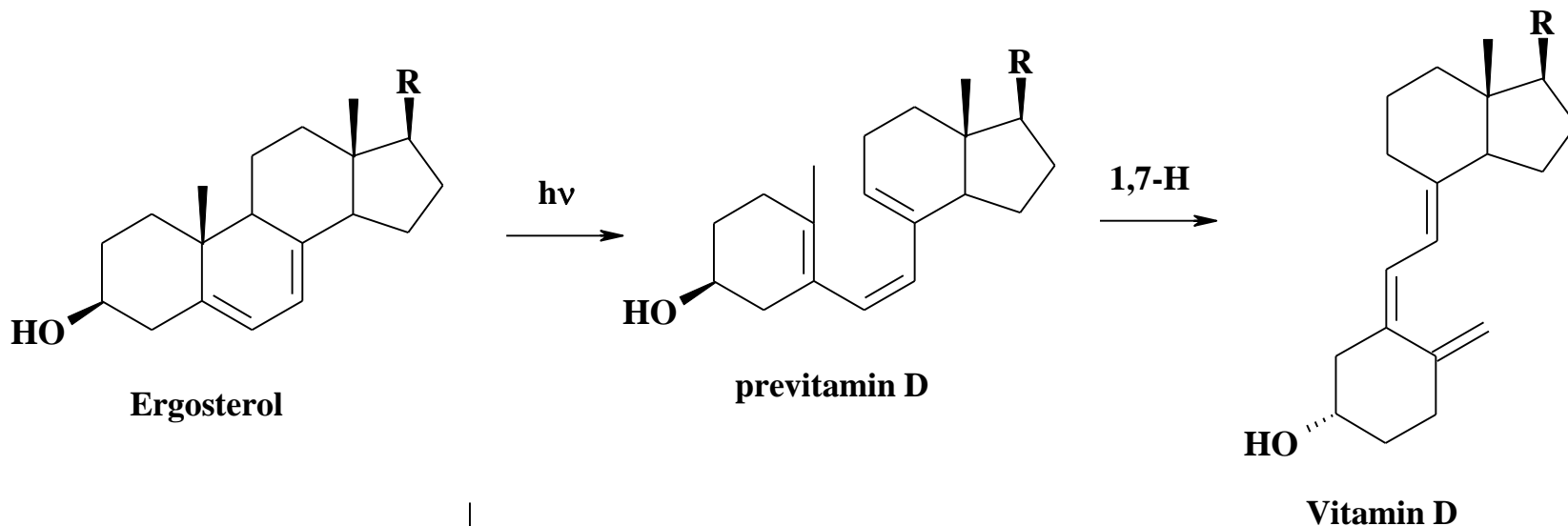


R = Me

R = CHMe







Thank You



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