

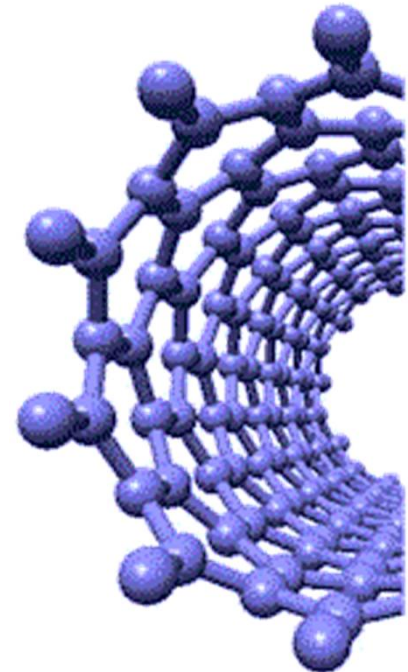


INVESTMENTS IN EDUCATION DEVELOPMENT

# Innovation and Development of Study Field Nanomaterials at the Technical University of Liberec

[nano.tul.cz](http://nano.tul.cz)

These materials have been developed within the ESF project: Innovation and development of study field Nanomaterials at the Technical University of Liberec



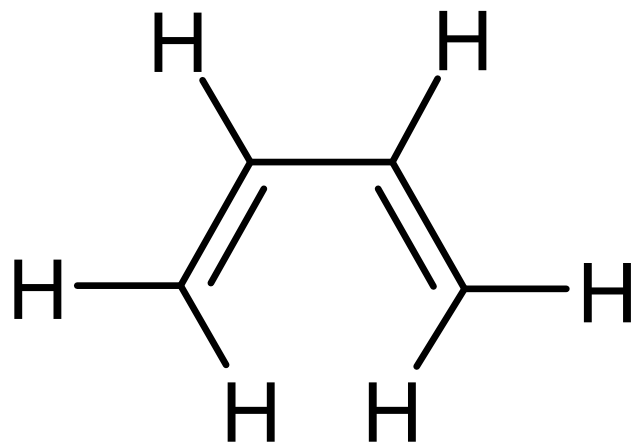
TECHNICAL UNIVERSITY OF LIBEREC  
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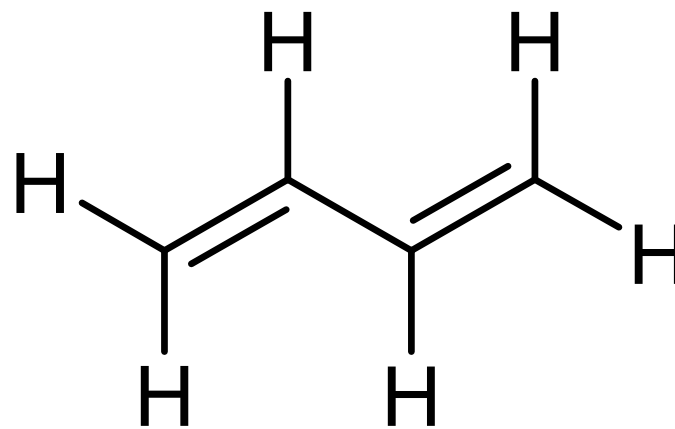
## Organic Chemistry I – Chapter 7



Introduction to macromolecular chemistry, Diene synthesis – reactions controlled by symmetry of  $\pi$  orbitals.



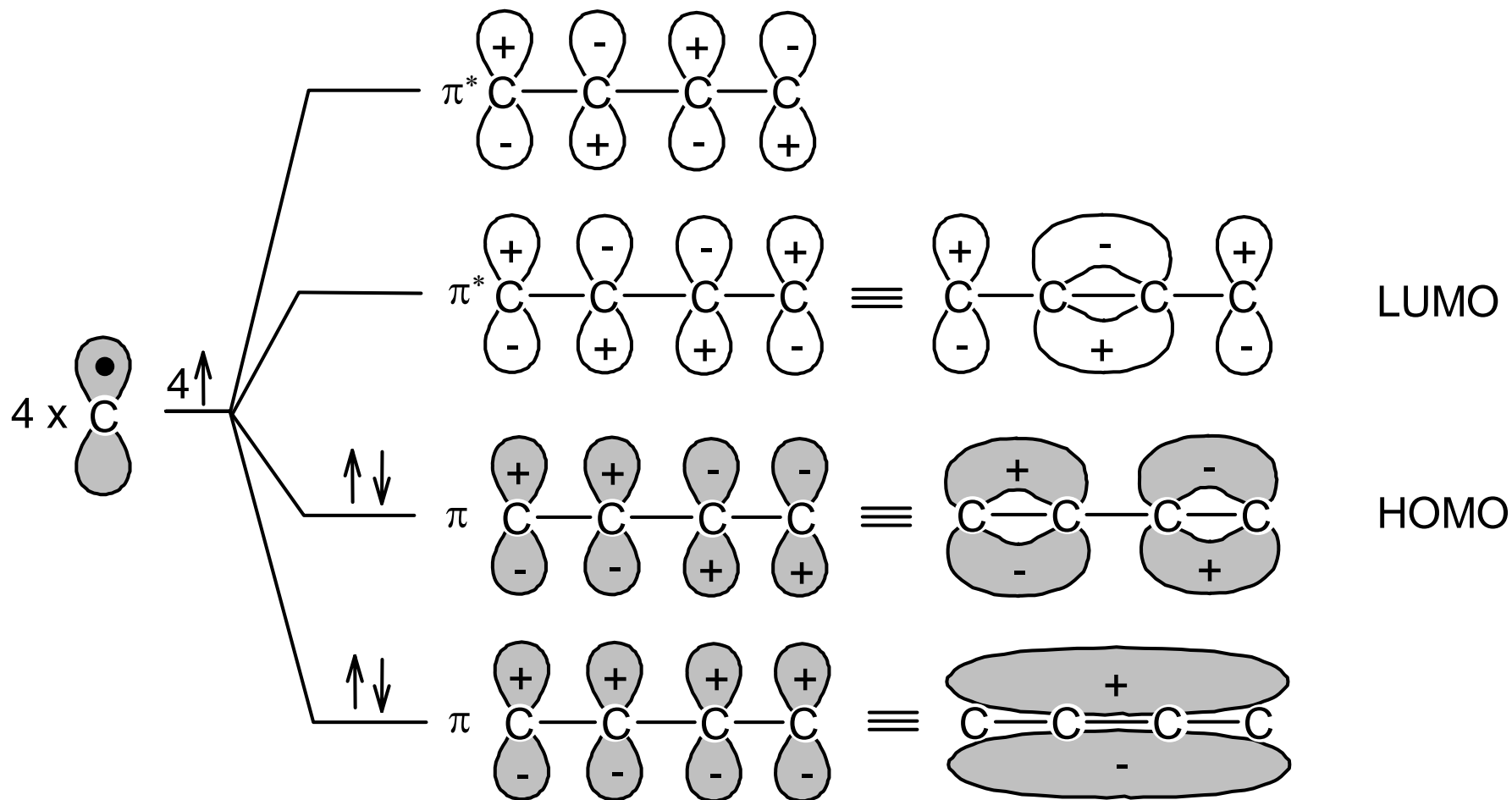
*s-cis*



*s-trans*



## Conjugated dienes - $\pi$ -molecular orbitals

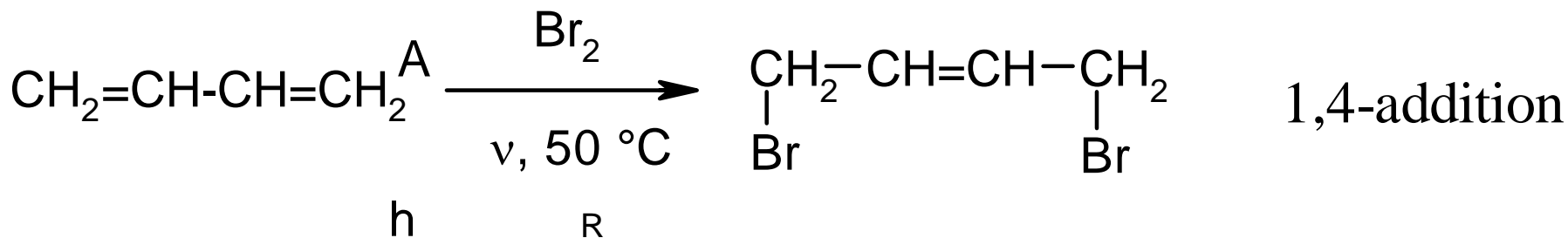
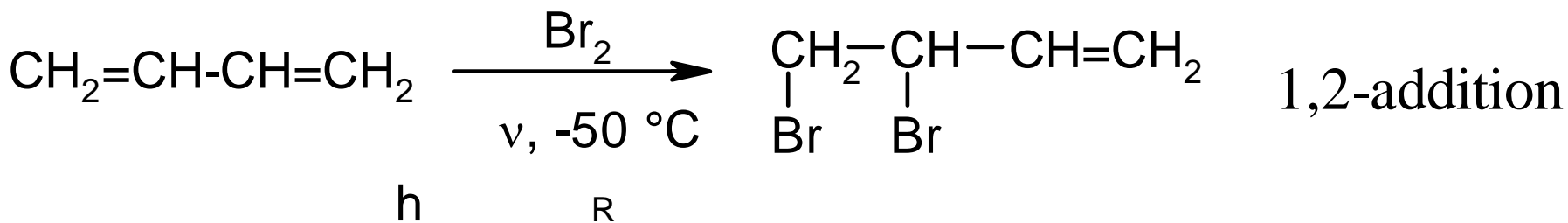
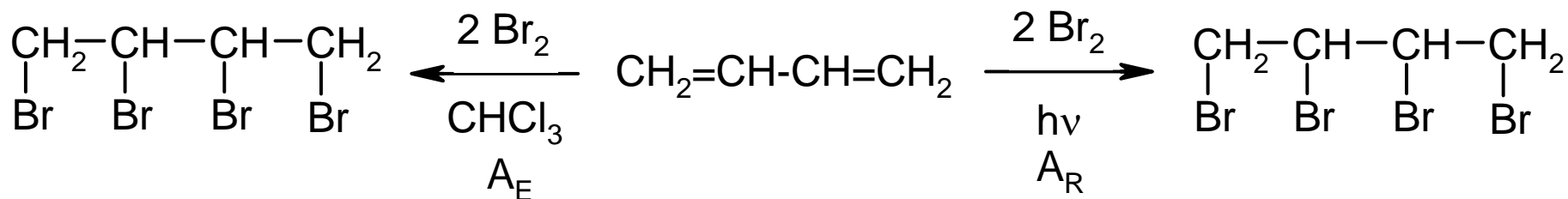




# Organic Chemistry – functional groups



## Conjugated dienes - reactions – additions radical and electrophilic

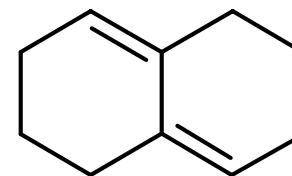
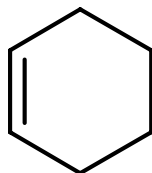
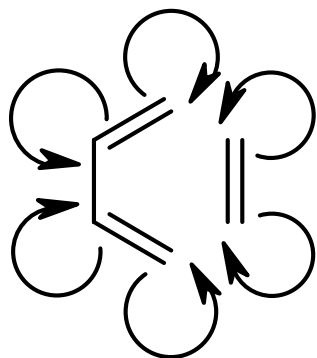




# Organic Chemistry – functional groups



## Conjugated dienes - reactions – diene reaction (Diels-Alder, D-A)



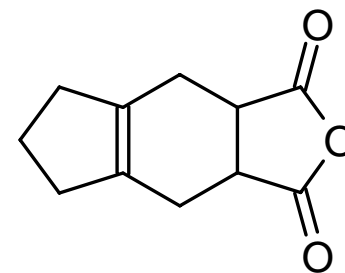
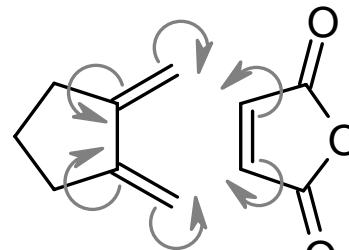
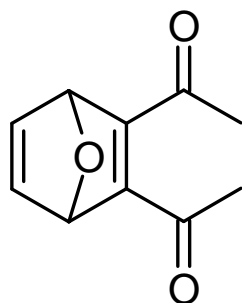
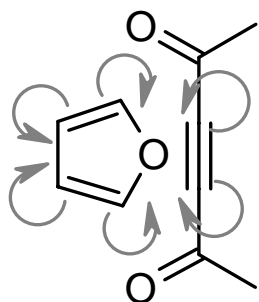
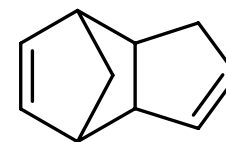
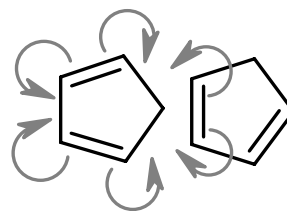
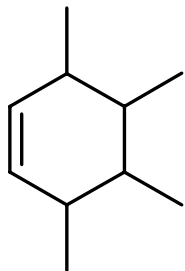
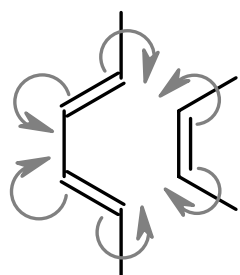
bicyclo[4.4.0]deka-1,6-diene



# Organic Chemistry – functional groups



## Conjugated dienes - reactions – diene reaction (Diels-Alder, D-A)

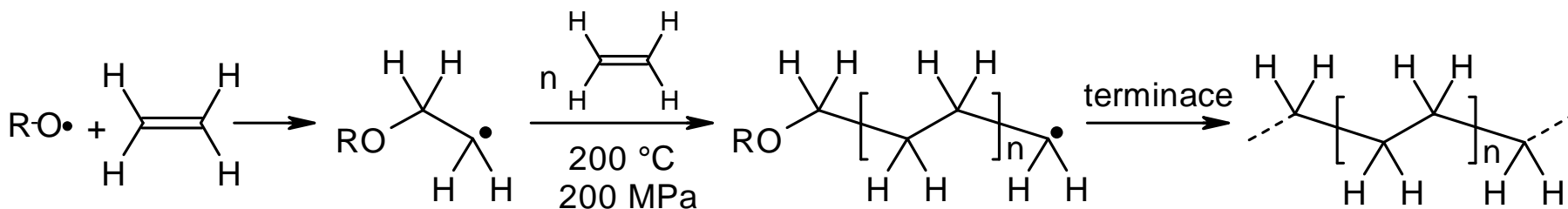
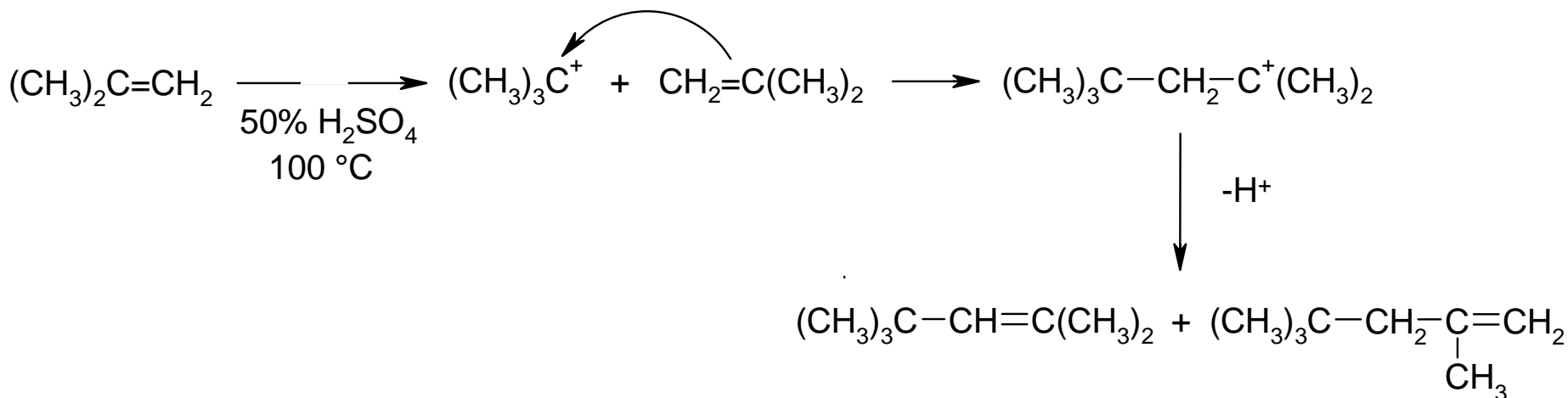




# Organic Chemistry – functional groups



## alkenes - polymers





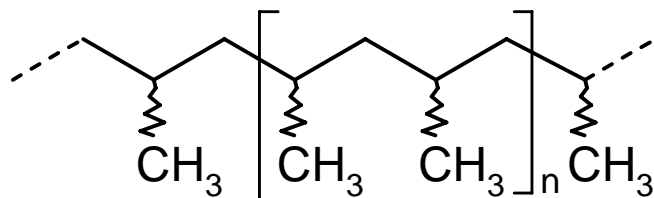
# Organic Chemistry – functional groups



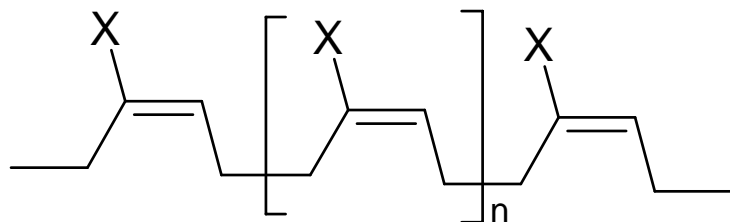
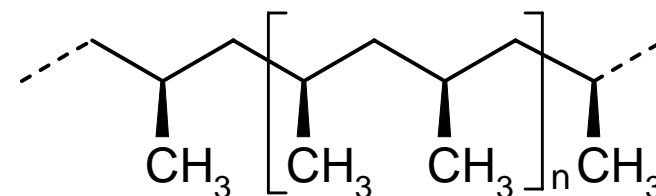
## Alkenes and dienes - polymers

Polypropylene

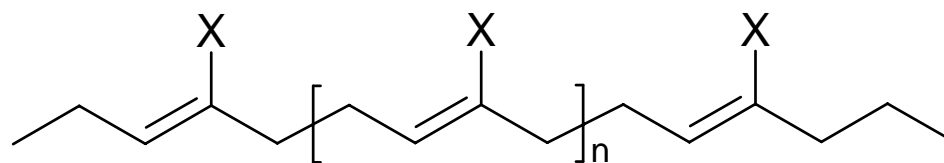
atactic



isotactic



all-cis  
elastic



all-trans

X = H, CH<sub>3</sub>, Cl    poly-butadiene, isoprene, chloroprene