

# Alkyny



# Alkyny - klasifikace



ethyn  
(acetylen)

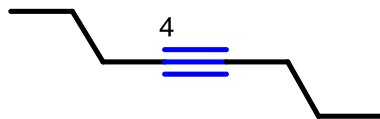


terminální alkyn

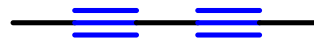


interní alkyn

Alkyny – názvosloví (přípona **-yn**)

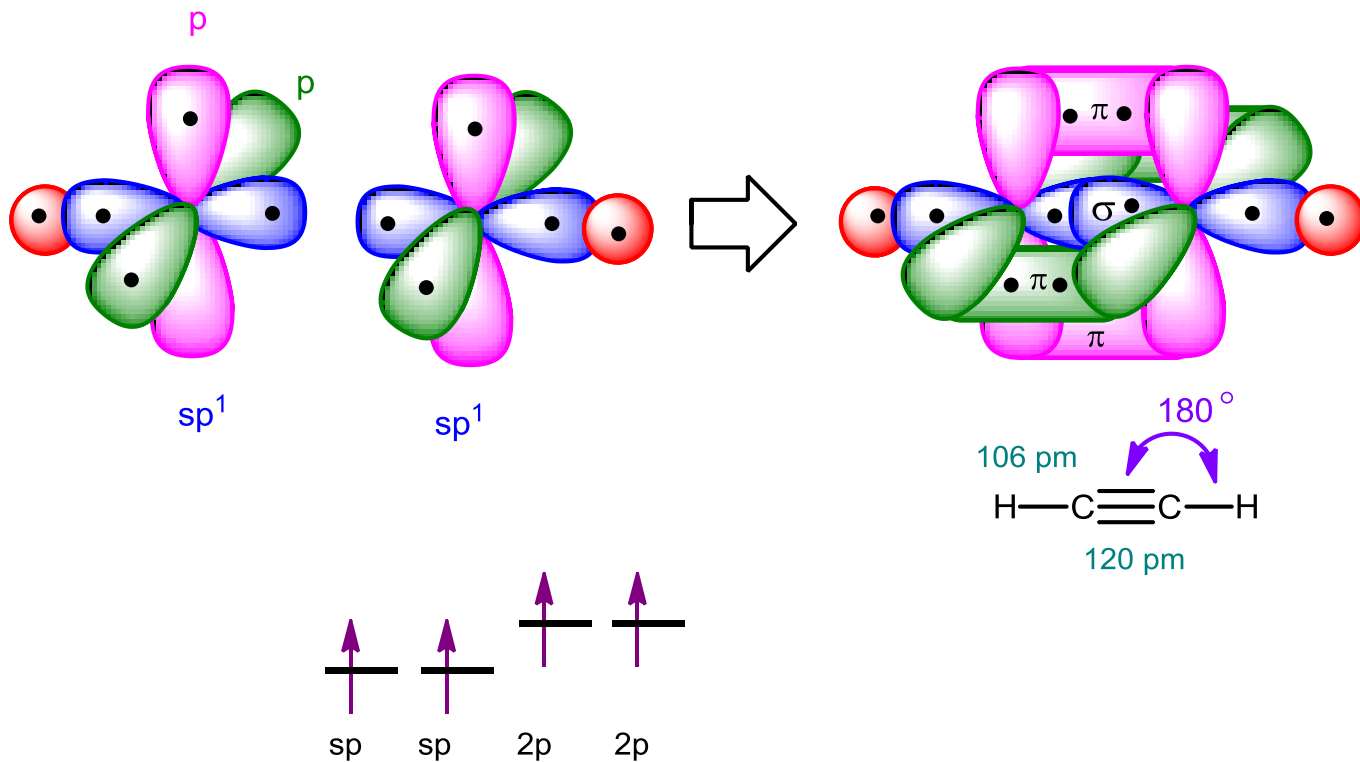


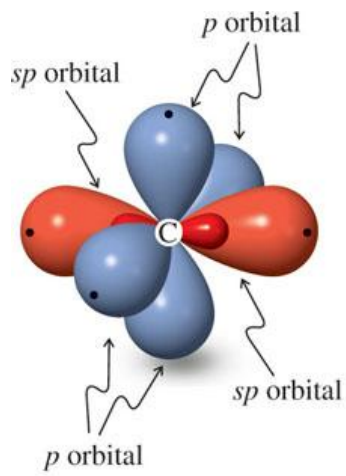
okt-4-yn



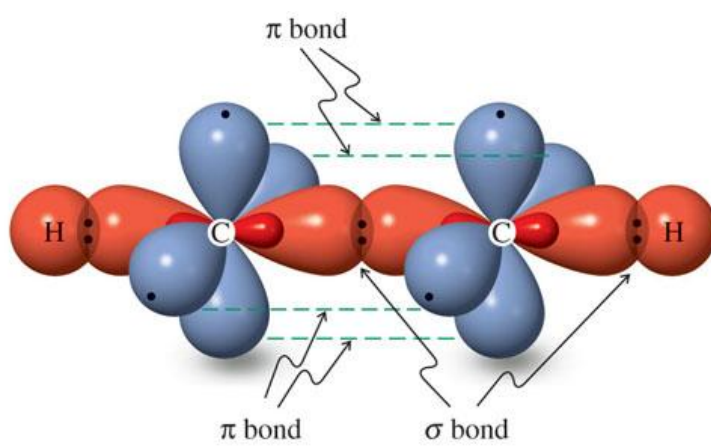
hexa-2,4-diyne

# Molekulové orbitály – trojná vazba $C\equiv C$ , molekula ethynu

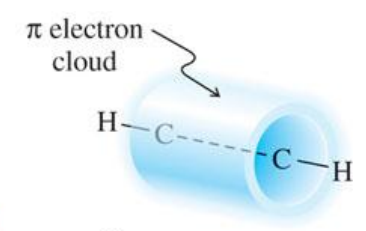




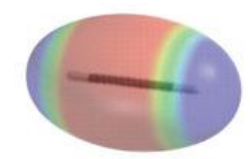
A



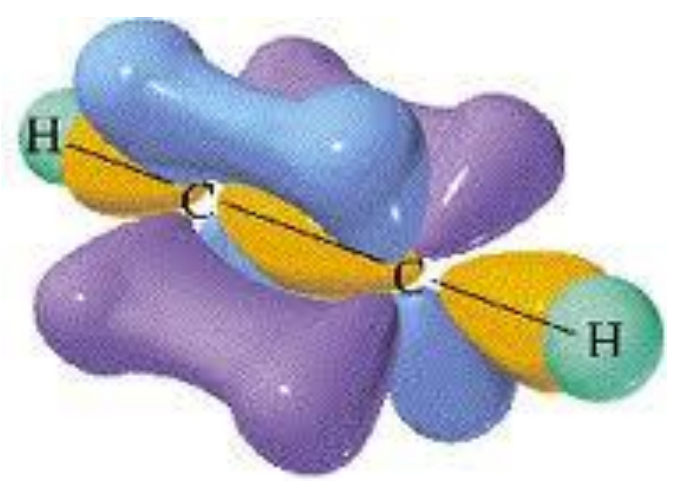
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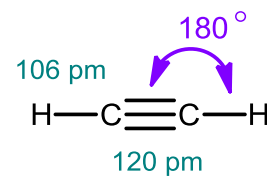
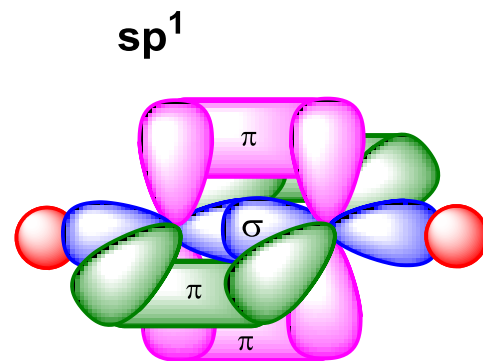
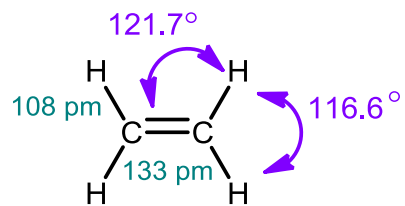
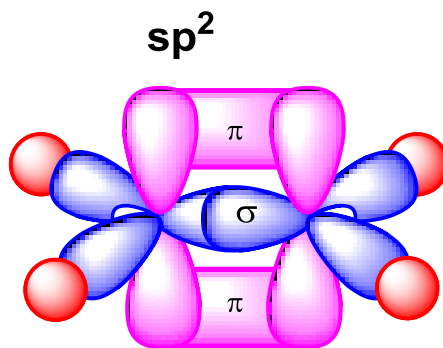
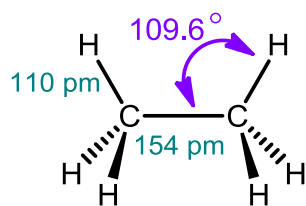
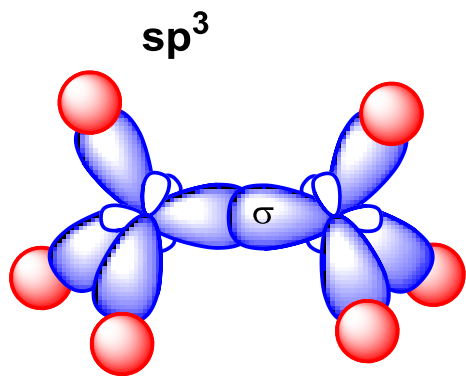


C

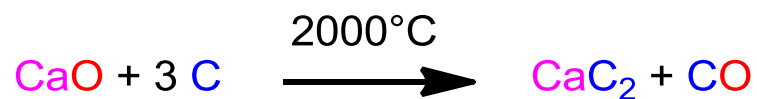
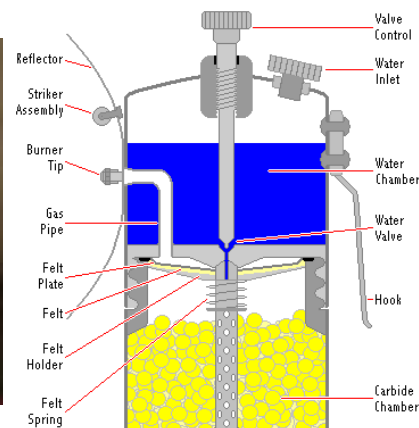
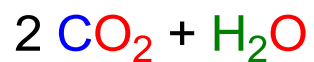
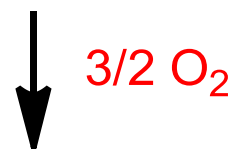


D

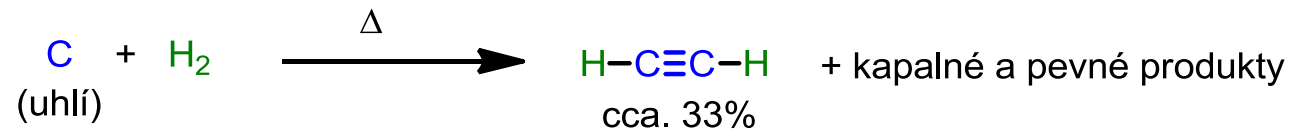




## Karbid vápenatý – karbidová lampa

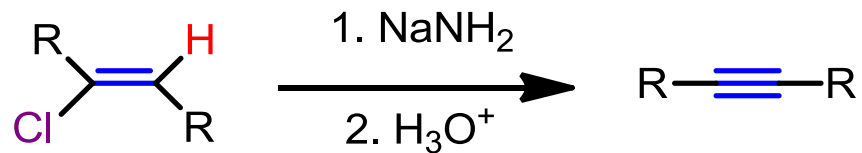
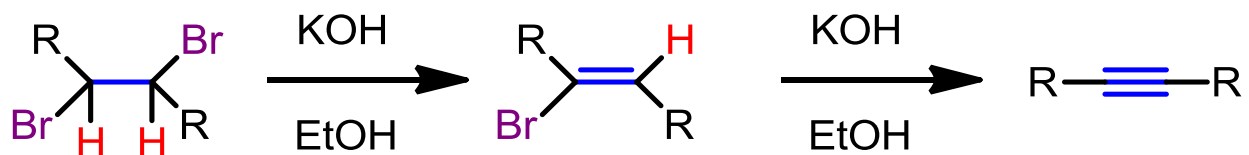


## Průmyslová výroba acetylenu



# Příprava alkynů - eliminace

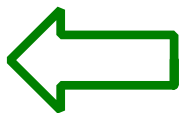
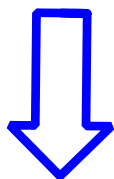
Eliminace halogenovodíků - silnou bází





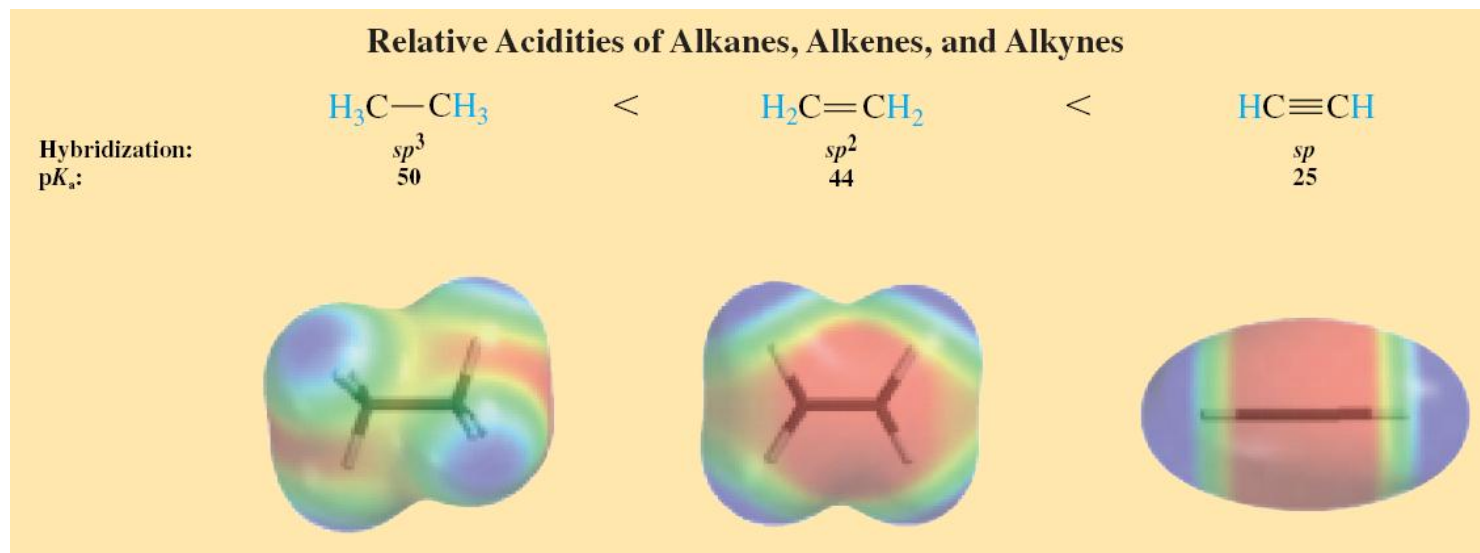
# Reaktivita alkynů

Reakce trojné vazby  
(adice)



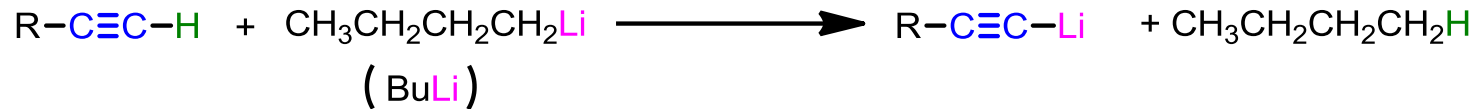
Reakce koncové C-H  
(deprotonace....)

## Acidita terminálních alkyňů

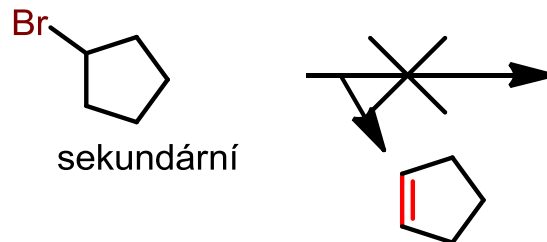
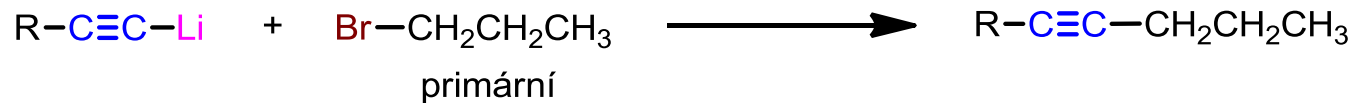


# Deprotonace terminálních alkyň a následné reakce

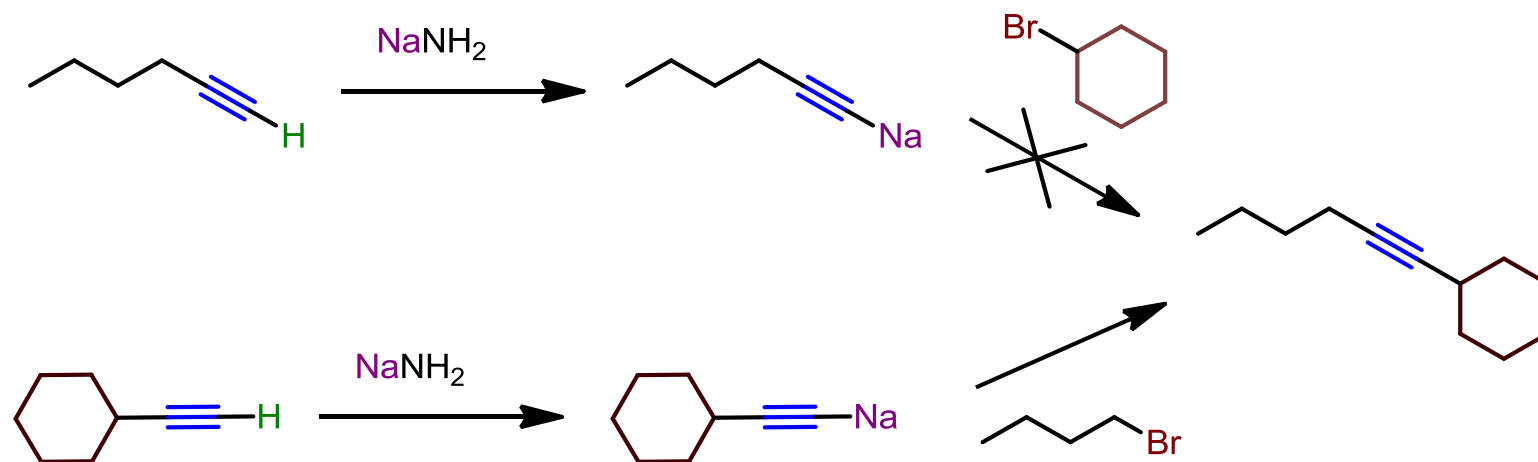
Reakce se silnými bázemi - deprotonace



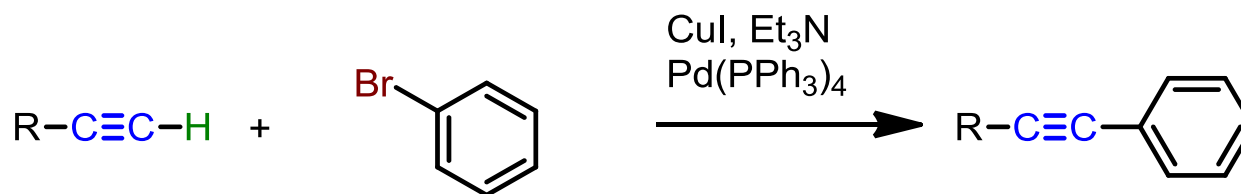
Deprotonace + alkylace



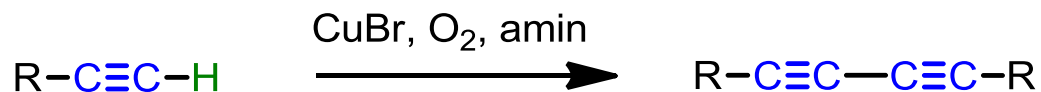
## Deprotonace + alkylace - organická syntéza



## Sonogashirova reakce – příprava aryl-alkynů

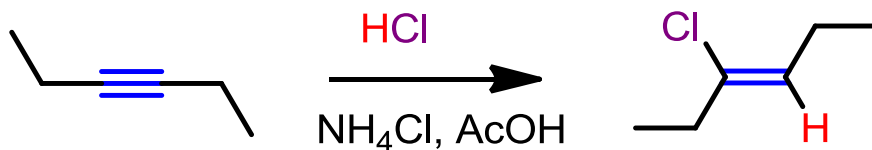
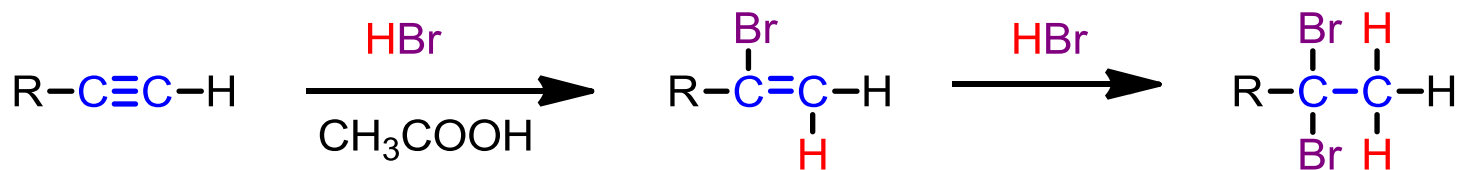


## Glaserův coupling – příprava diacetylenů



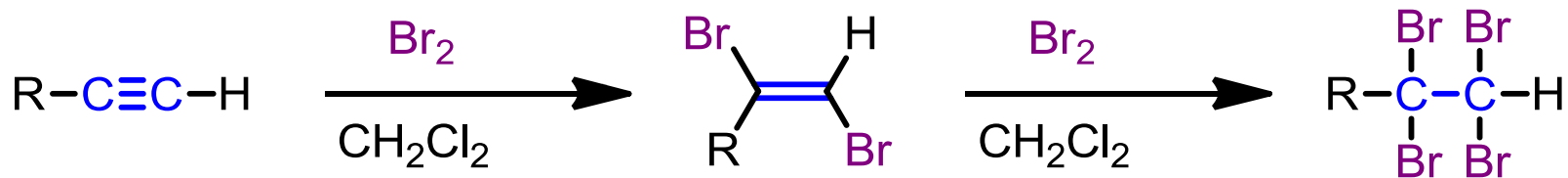
# Adice na alkeny

## Adice halogenvodíků

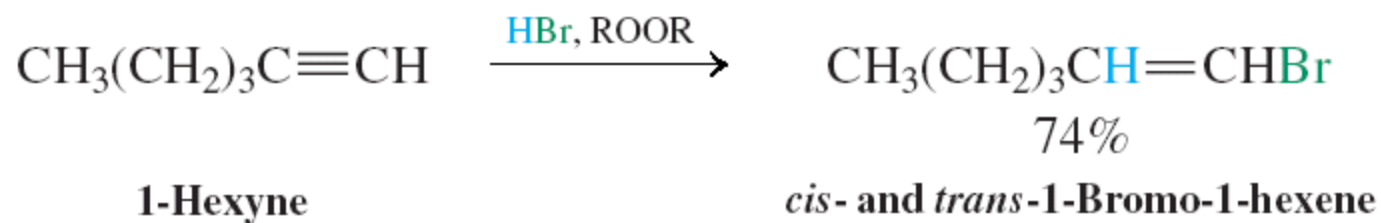


adice HX probíhají obvykle jako *anti*-adice

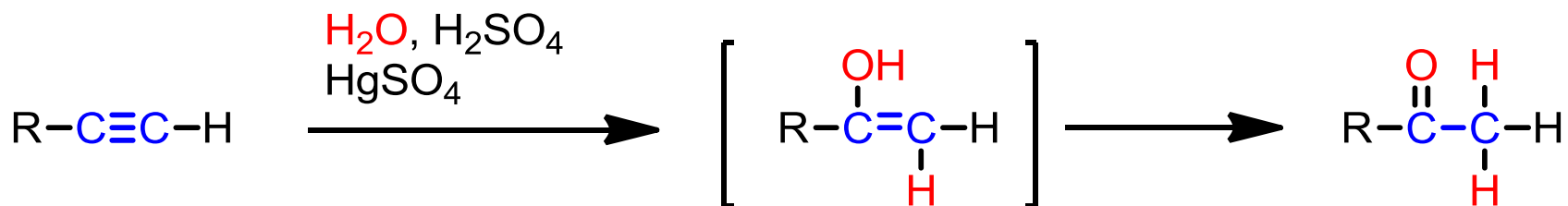
## Adice halogenů



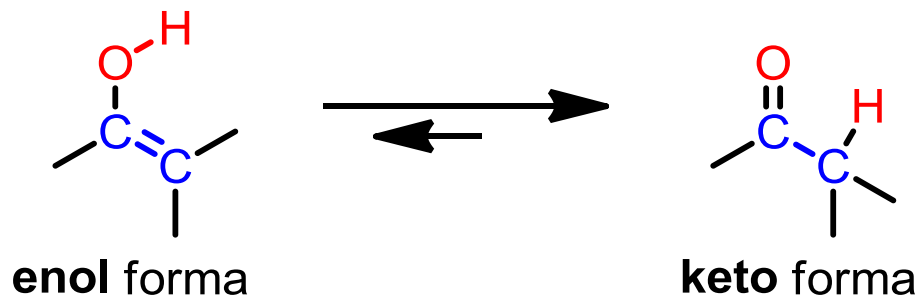
## Radikálová adice HBr na alkyny – neprobíhá podle Markovnikova pravidla



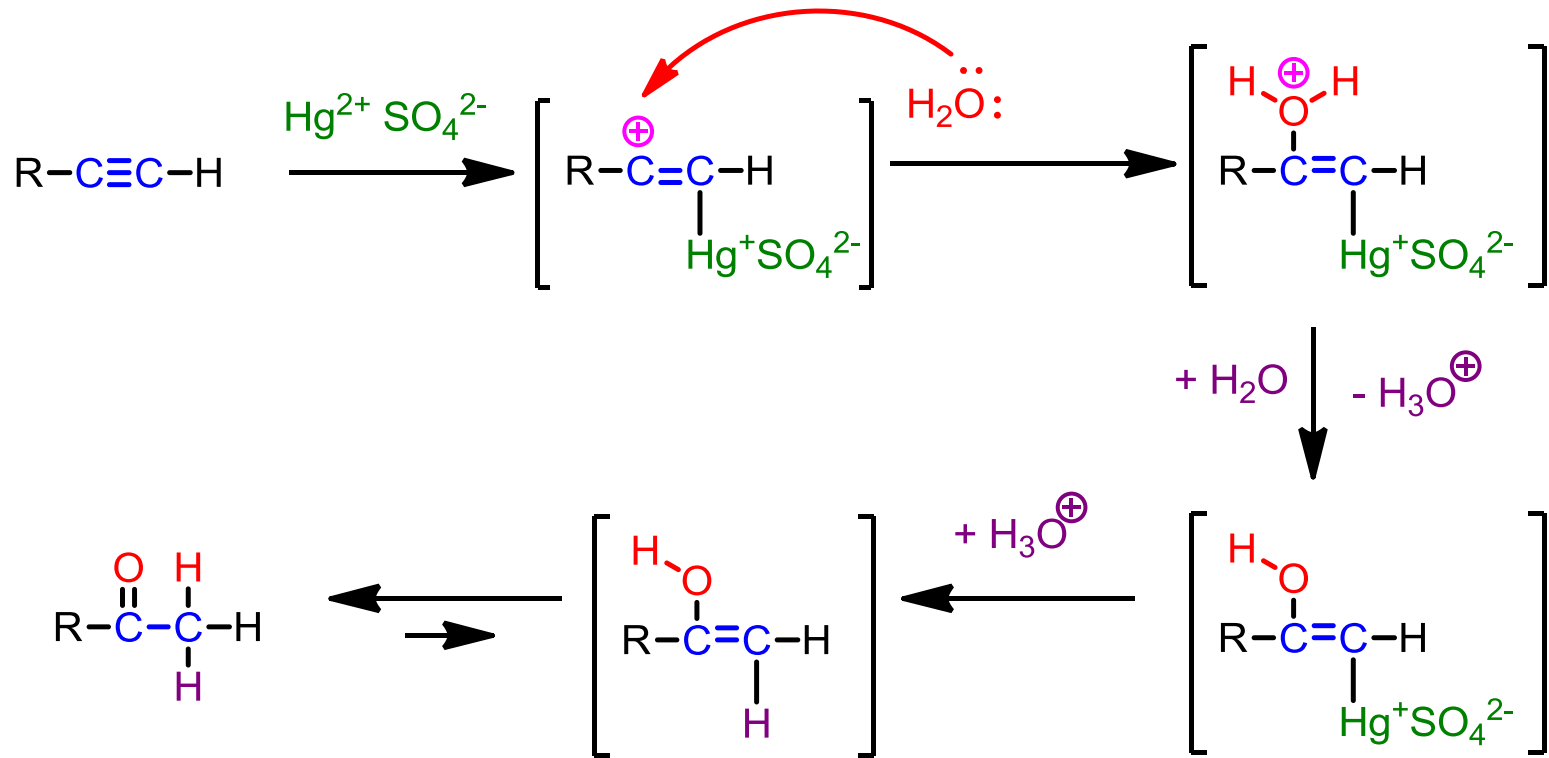
## Hydratace alkynů katalyzovaná $\text{Hg}^{2+}$



## Keto-enol tautomerie

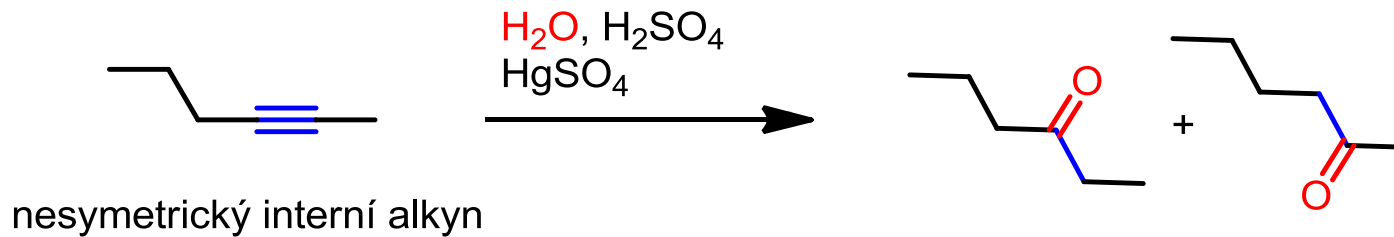
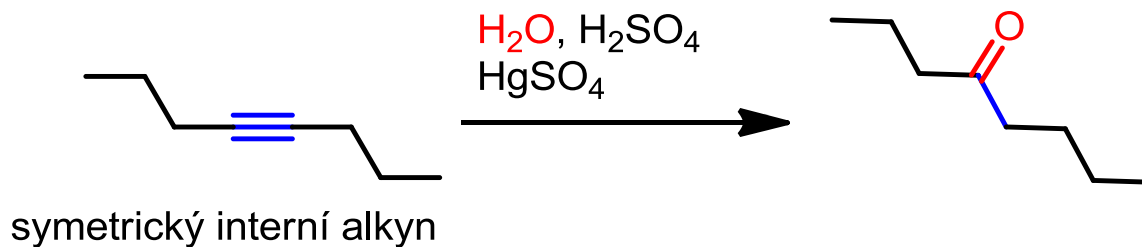
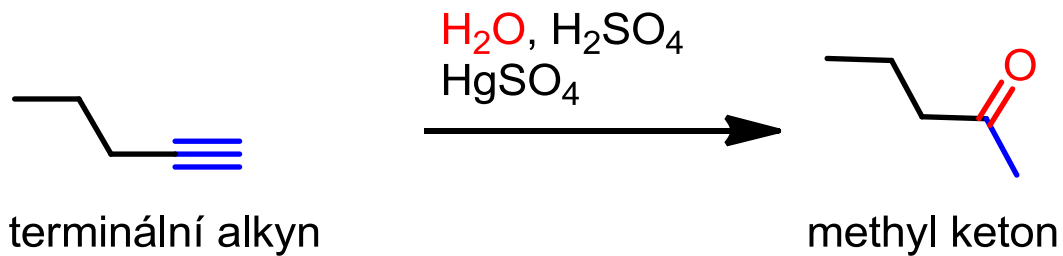


## Mechanismus hydratace alkyňů

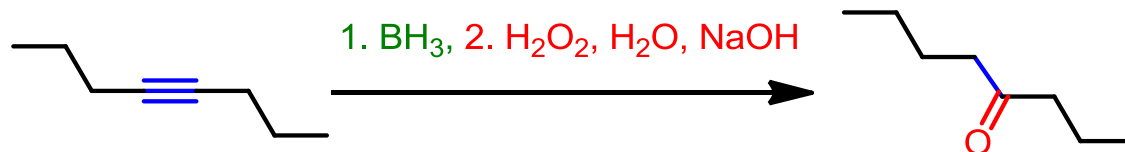
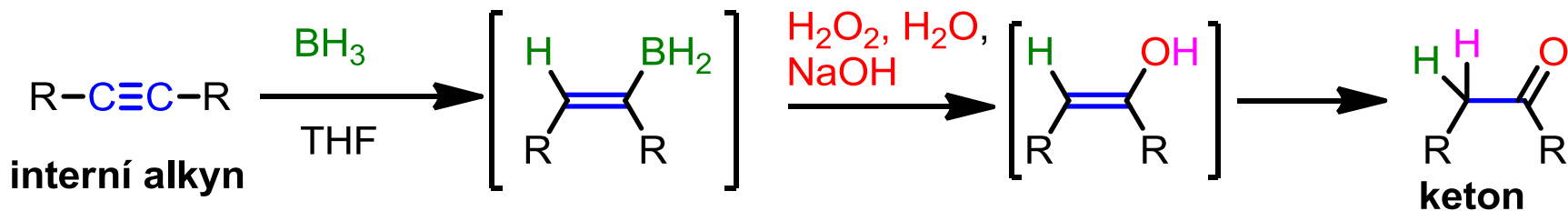
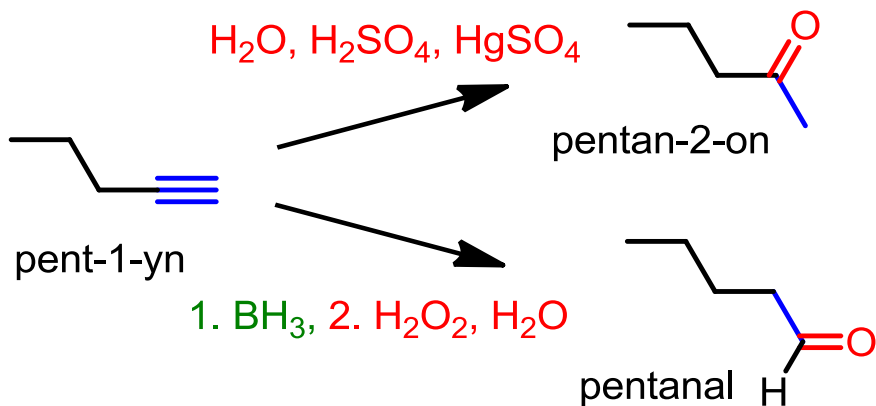
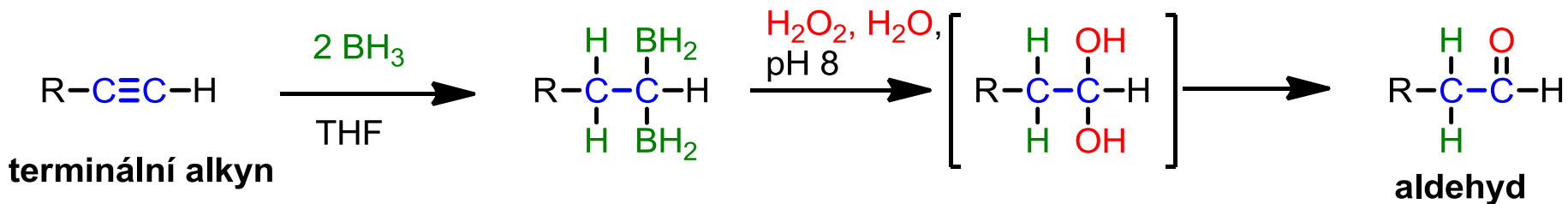




## Syntetické využití hydratace alkynů

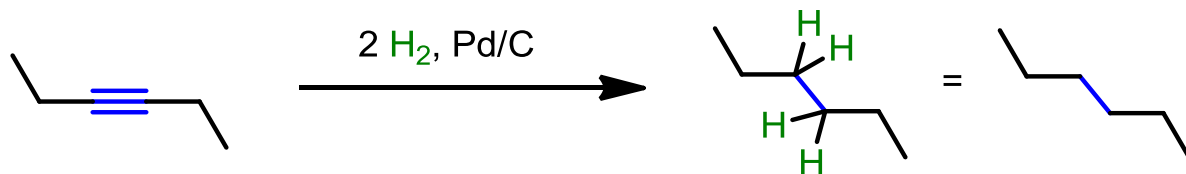


# Hydroborace alkynů následovaná oxidací

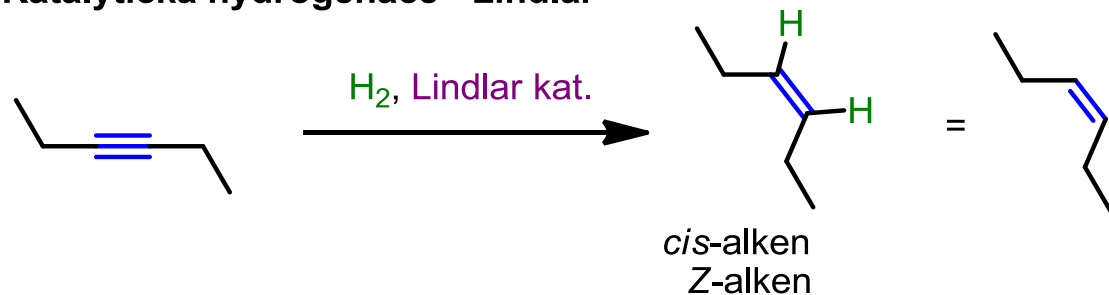


# Redukce alkynů

## Katalytická hydrogenace

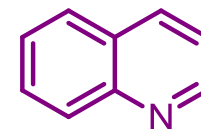


## Katalytická hydrogenace - Lindlar

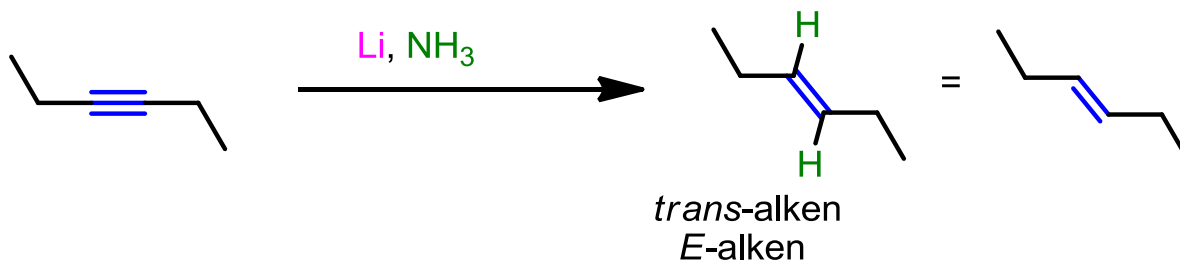


## Lindlarův katalyzátor

5% Pd/CaCO<sub>3</sub>, Pb(OAc)<sub>4</sub>, chinolin

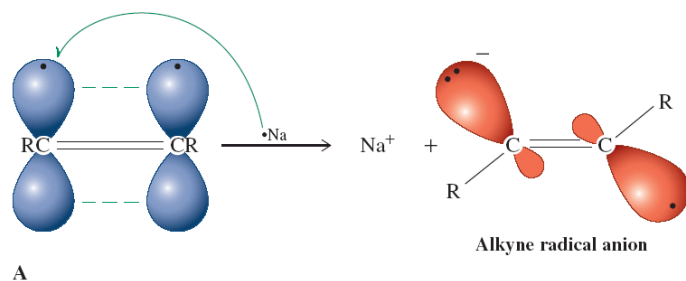


## Redukce alkalickým kovem v kapalném amoniaku (Birchova redukce)

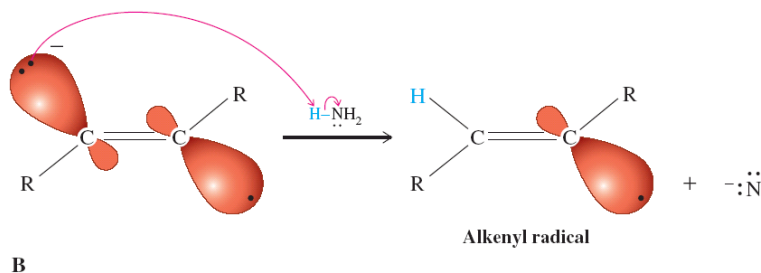


### Mechanism of the Reduction of Alkynes by Sodium in Liquid Ammonia:

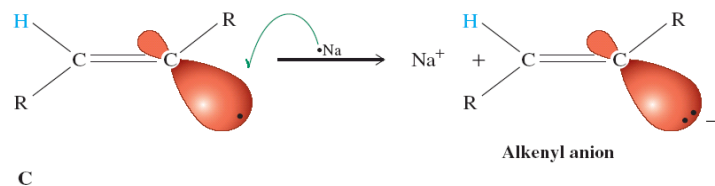
**STEP 1.** One-electron transfer



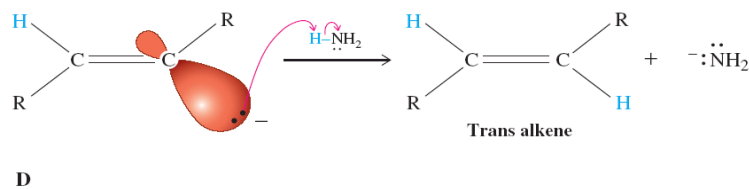
**STEP 2.** First protonation



**STEP 3.** Second one-electron transfer



**STEP 4.** Second protonation



Druhý transfer elektronu je rychlejší než cis/trans izomerizace alkenylového radikálu.

Finální alken je stabilní vůči redukci.

## Oxidativní štěpění alkynů

