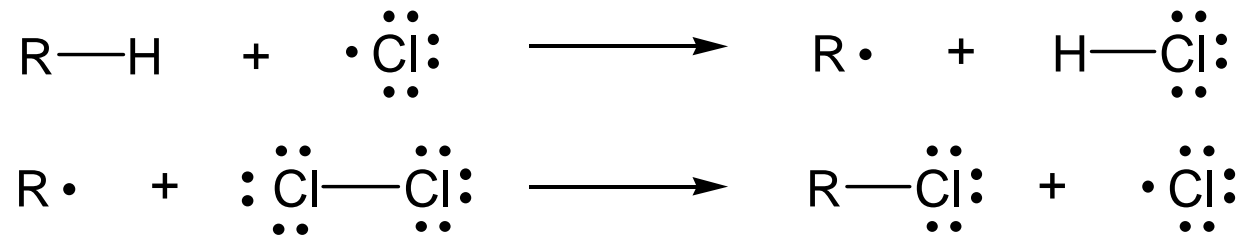
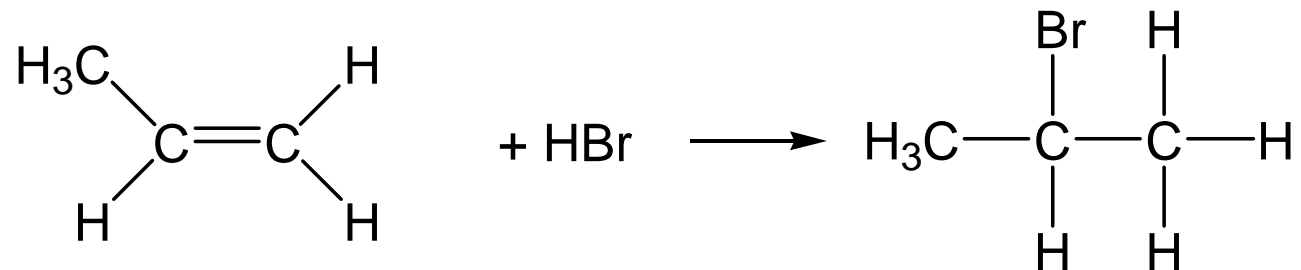


Halogenalkane

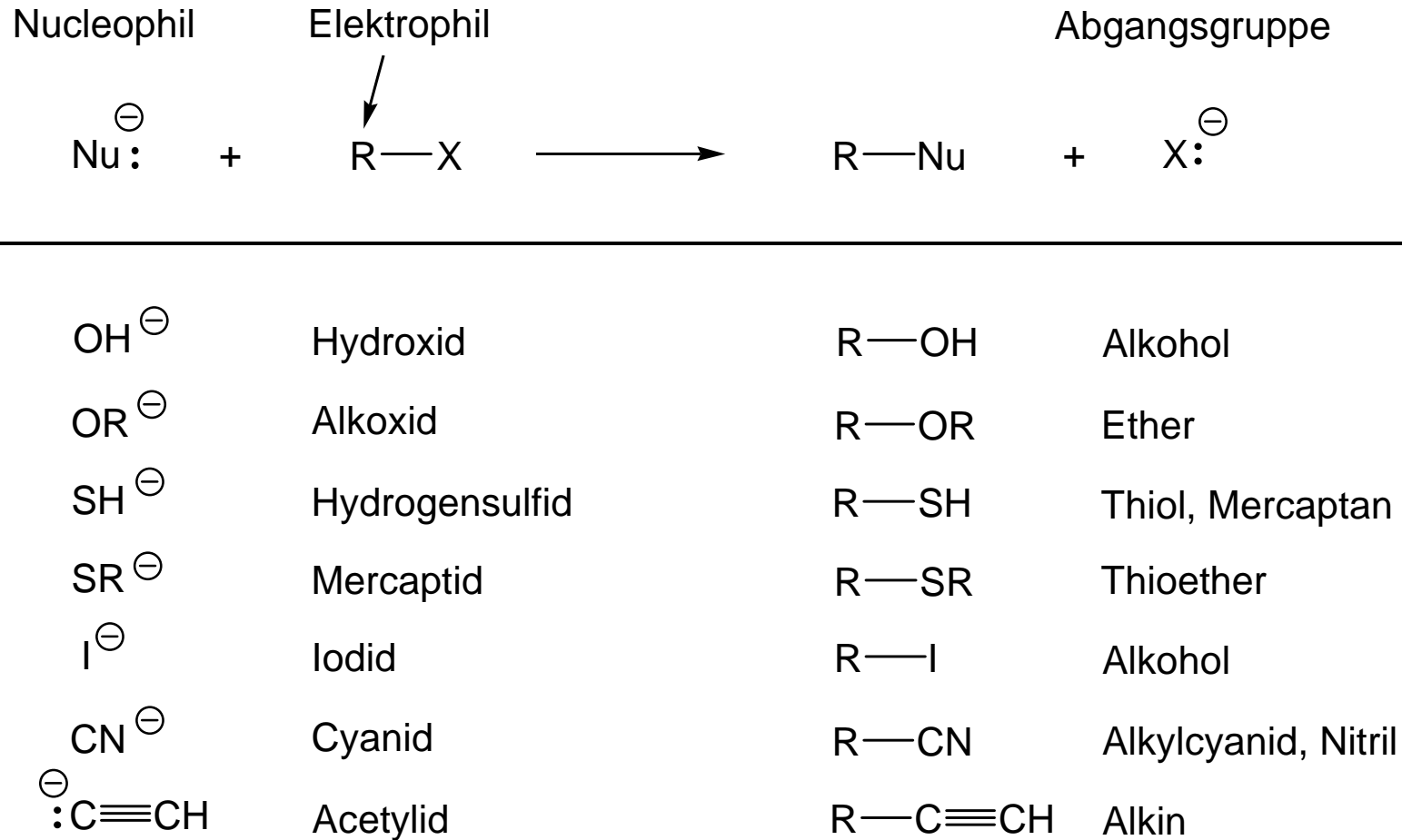
Herstellung: Radikalische Halogenierung von Alkanen

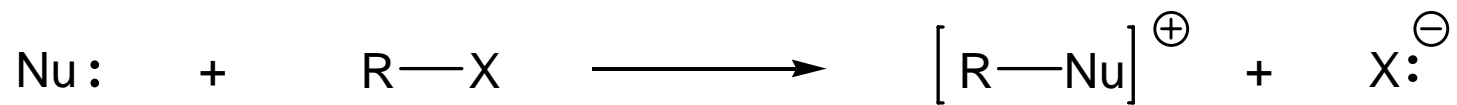


Addition von Halogenwasserstoffen an Alkene

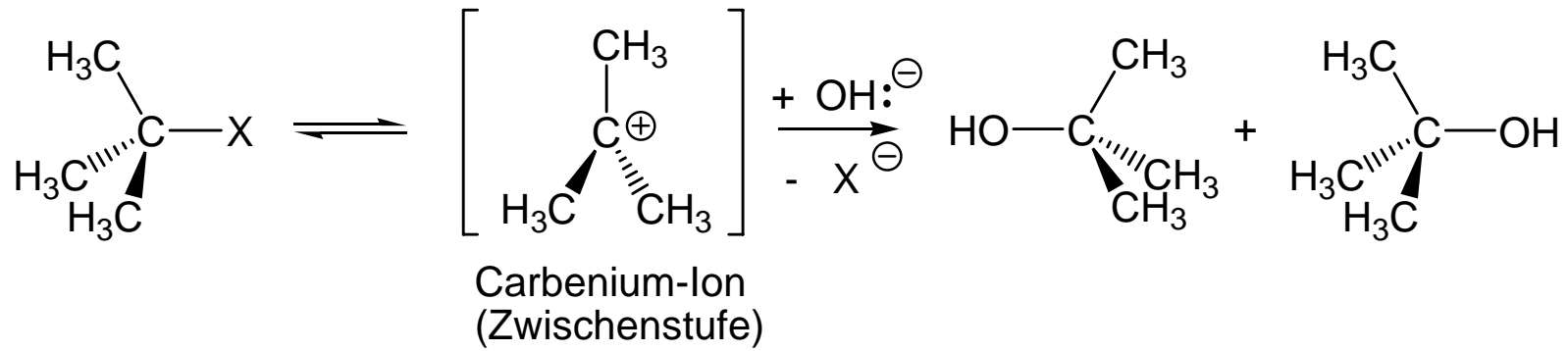


Nucleophile Substitution an Alkylhalogeniden

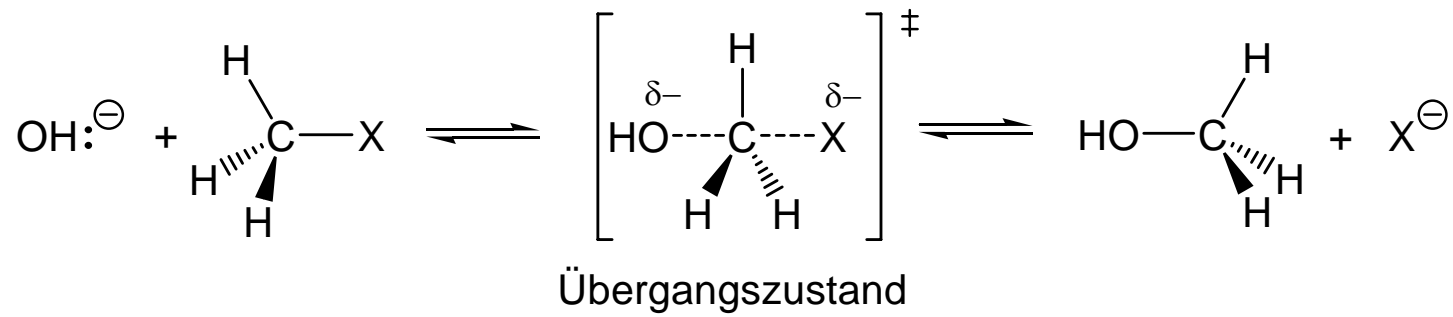




S_N1-Mechanismus

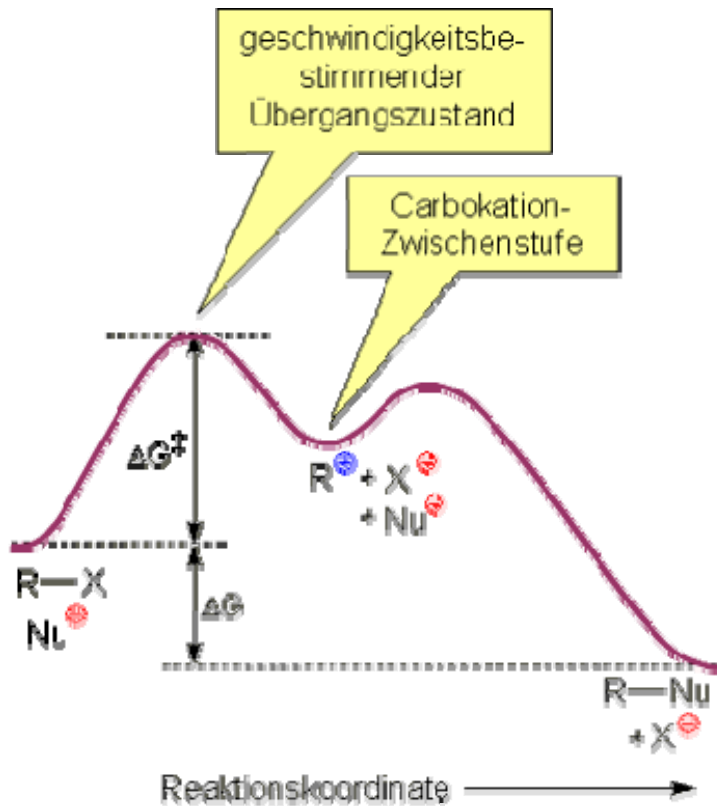


S_N2-Mechanismus

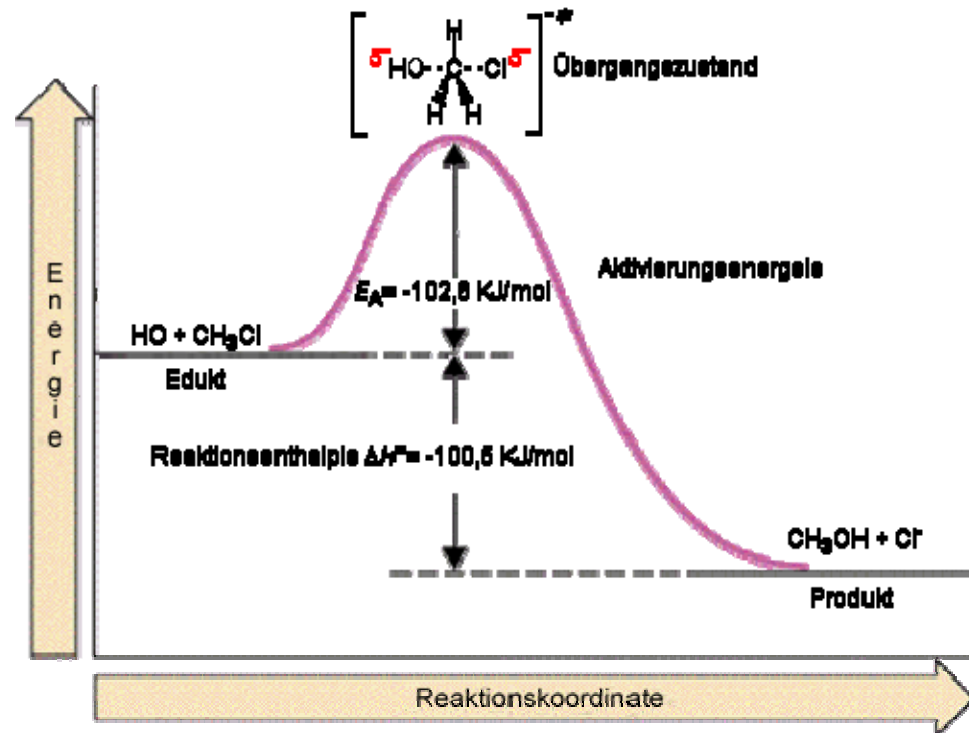


Energieprofile

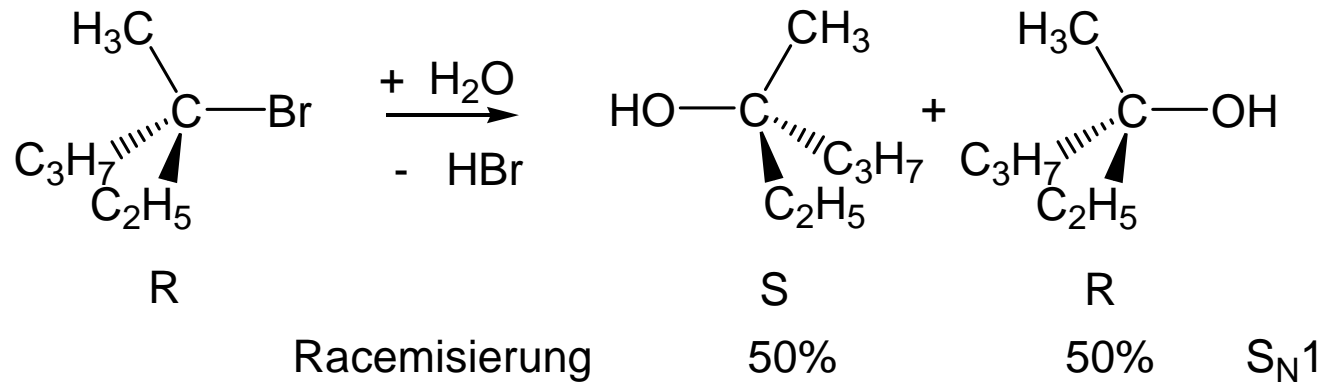
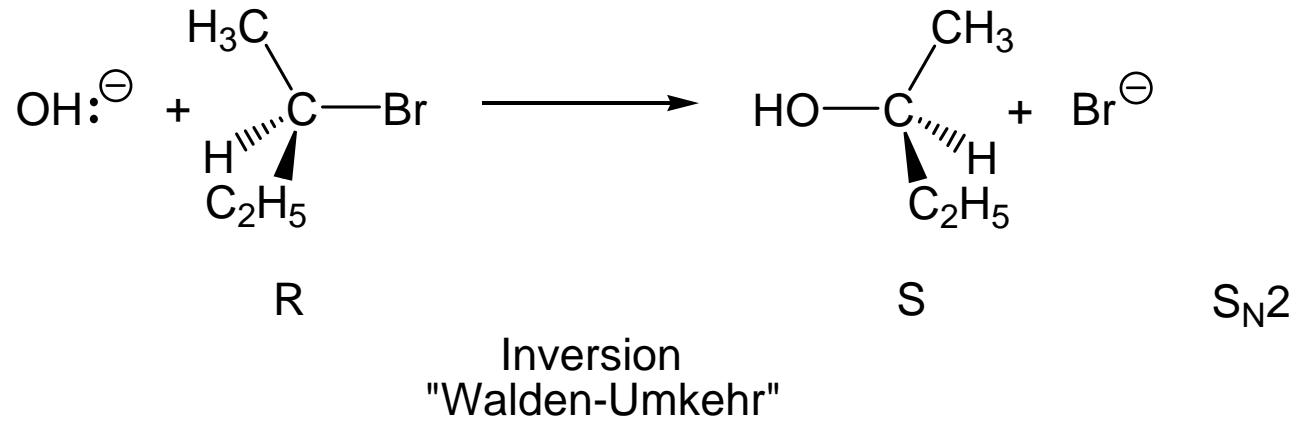
S_N1-Mechanismus



S_N2-Mechanismus



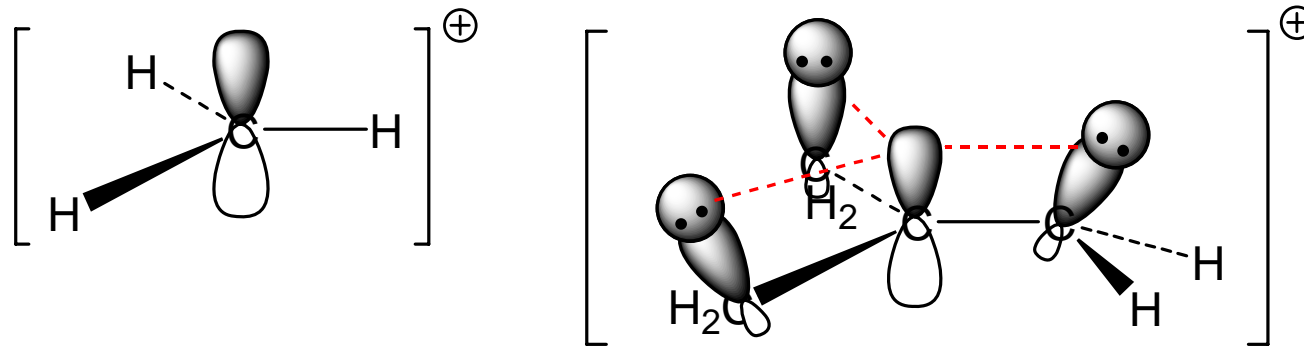
Einfluss des Reaktionsmechanismus auf die optische Aktivität



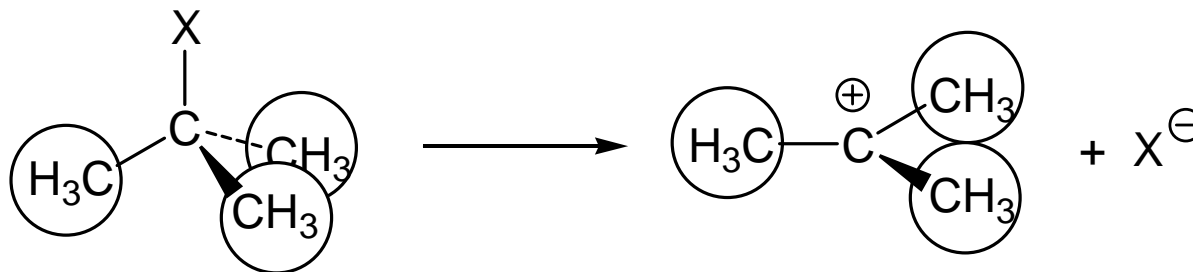
Vergleich der Mechanismen der nucleophilen Substitution

	S_N2	S_N1
Halogenid primär sekundär tertiär	üblich manchmal nie	nie manchmal üblich
Stereochemie	Inversion	Racemisierung
Nucleophil	vorzugsweise Ionen	vorzugsweise ungeladene Nucleophile
Lösungsmittel	unpolar	polar

Die Stabilität von Carbenium-Ionen

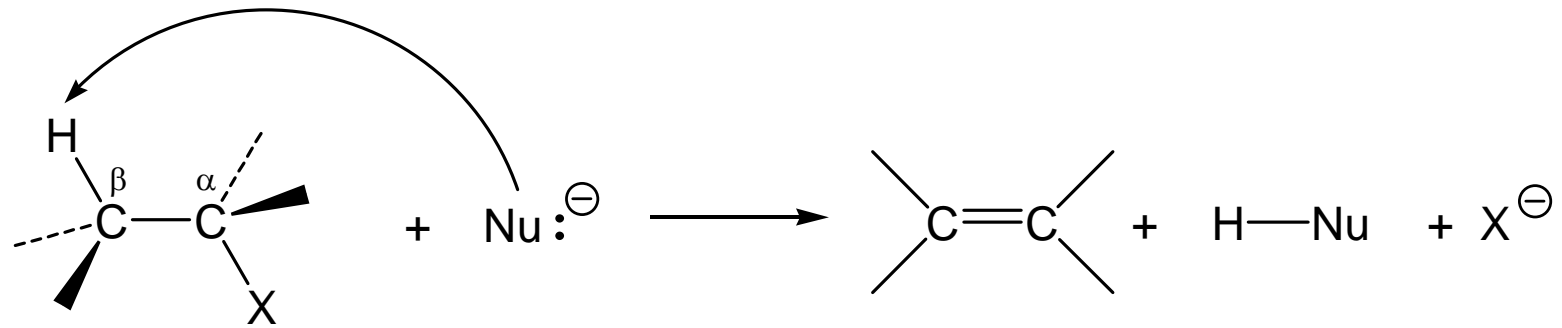


Tertiäre Carbenium-Ionen werden durch **Hyperkonjugation** stabilisiert.

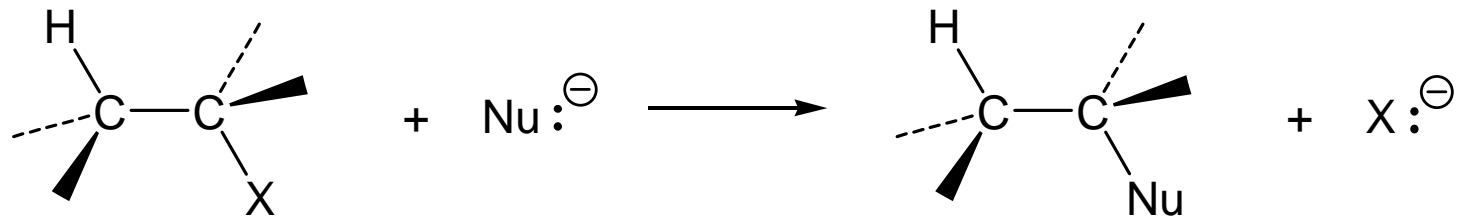


Die Dissoziation eines tert. Halogenalkans vermindert die sterische Spannung.

Die 1,2-Eliminierung



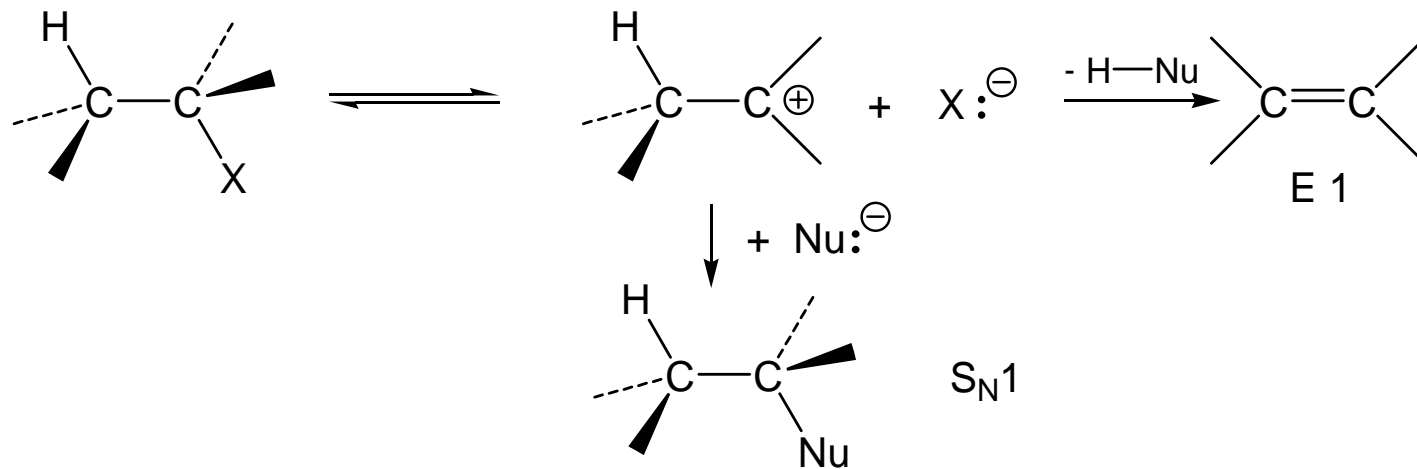
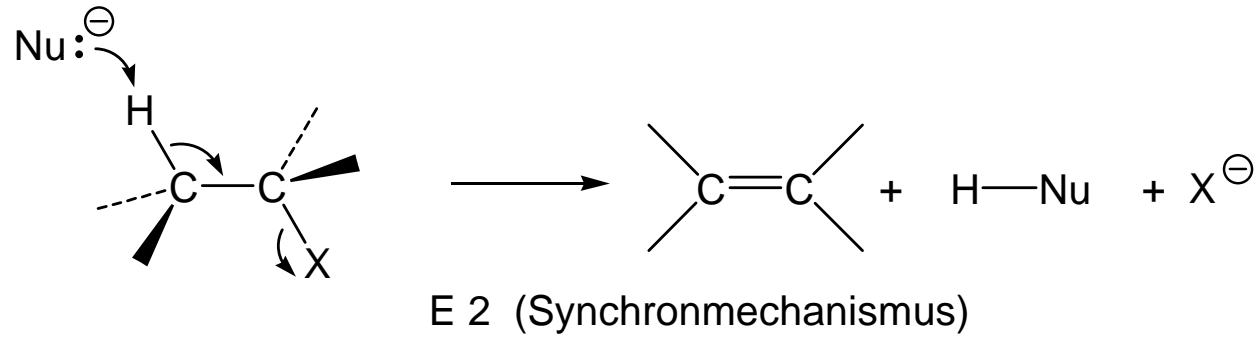
Eliminierung



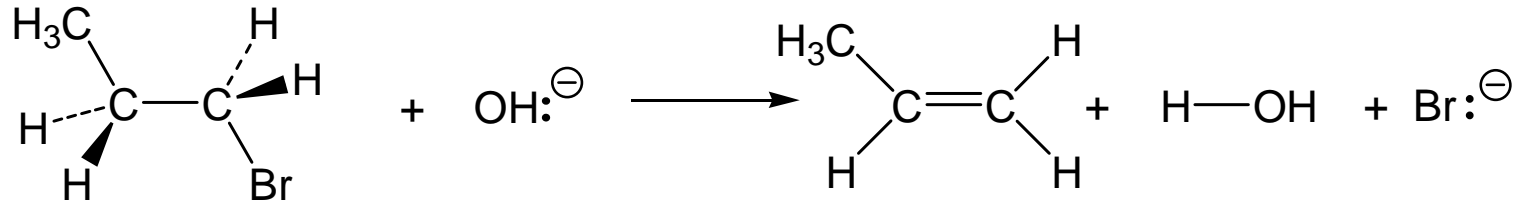
Substitution

Die 1,2-Eliminierung erfordert am β -Kohlenstoffatom ein Proton.

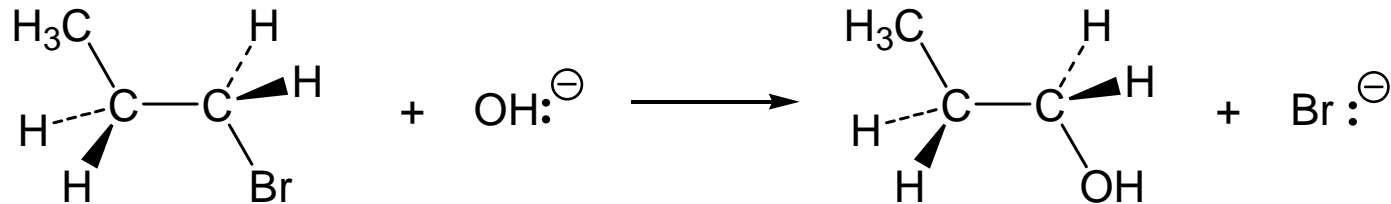
Die Mechanismen der Eliminierung



E 2 oder S_N2 ?

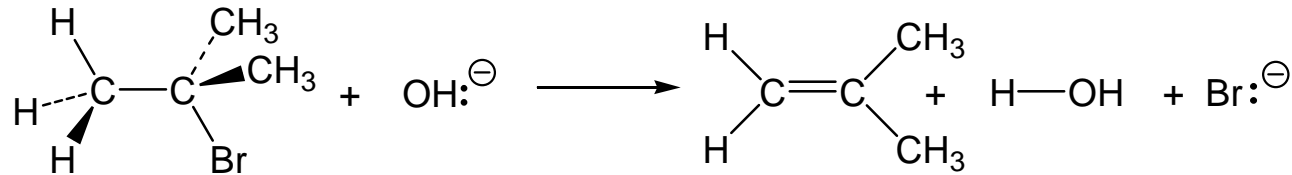


- unpolares Lösungsmittel
- hohe Basekonzentration
- hohe Temperatur

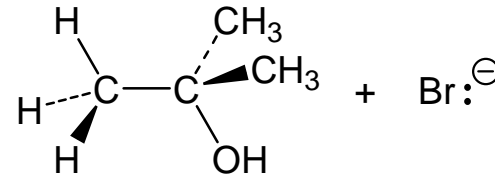


- polares Lösungsmittel
- niedrige Basekonzentration
- niedrige Temperatur

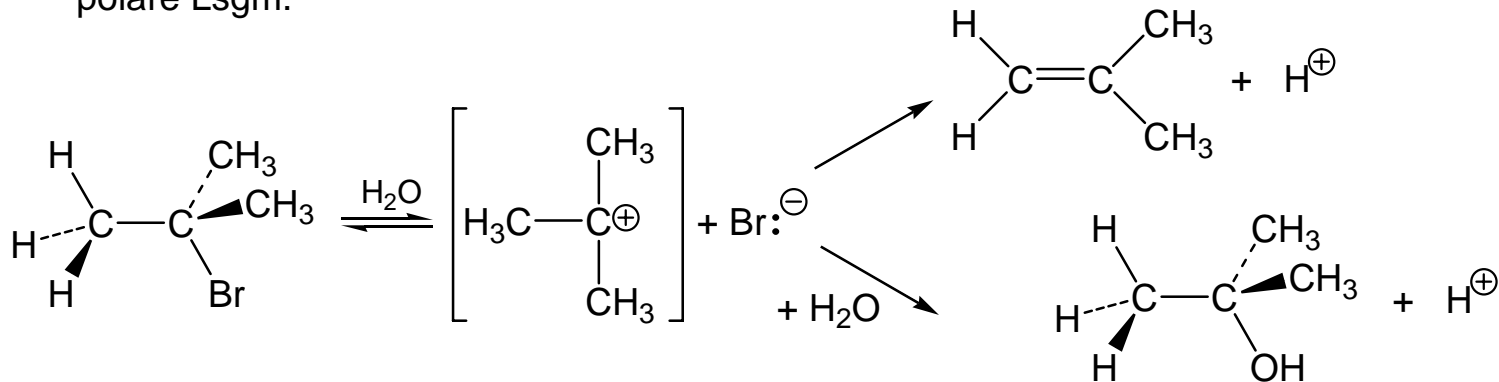
E1 oder S_N1 ?



E1: starke Base
unpolare Lsgm.

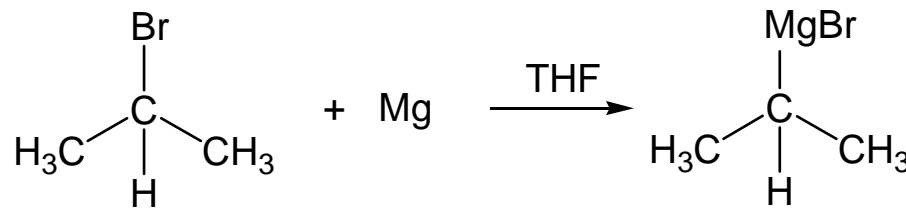
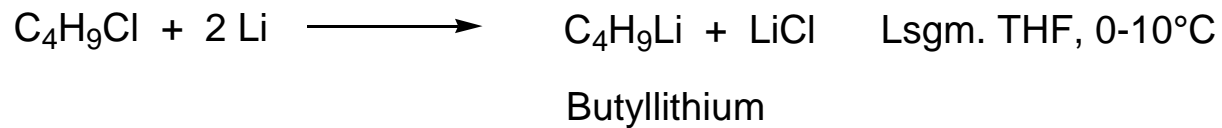
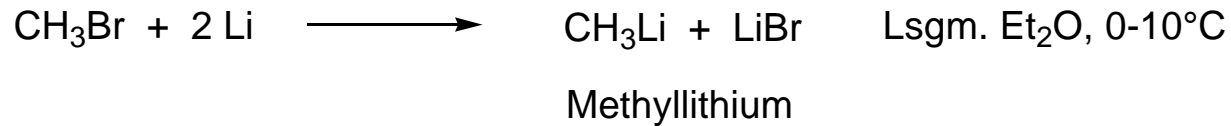


S_N1: schwache Base
polare Lsgm.



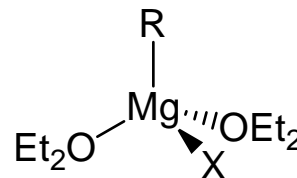
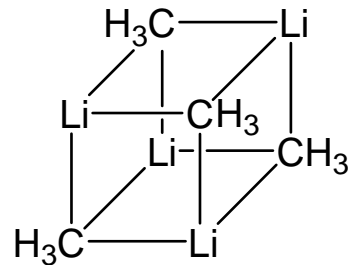
Die Eliminierung kann bei tertiären Alkanen nie ausgeschlossen werden.

Organolithium- und Organomagnesiumverbindungen



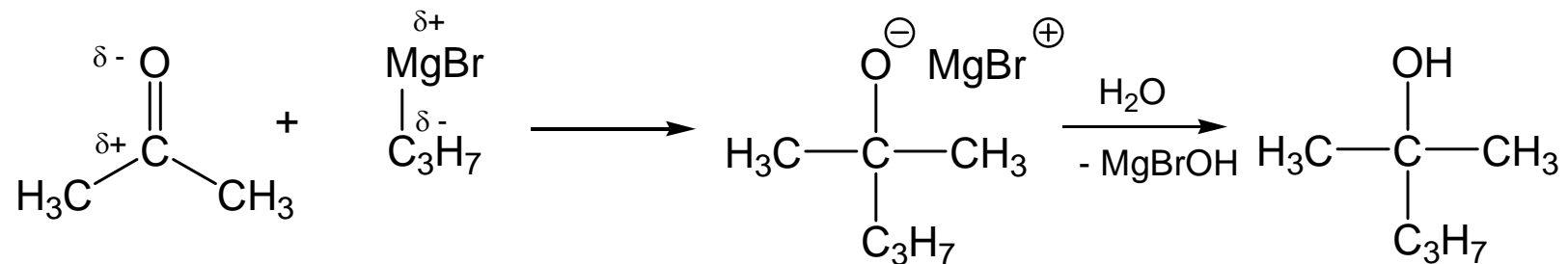
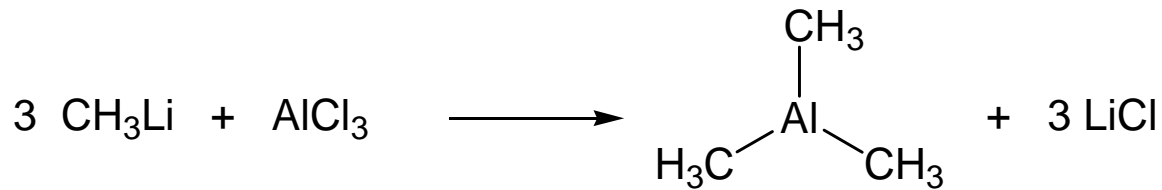
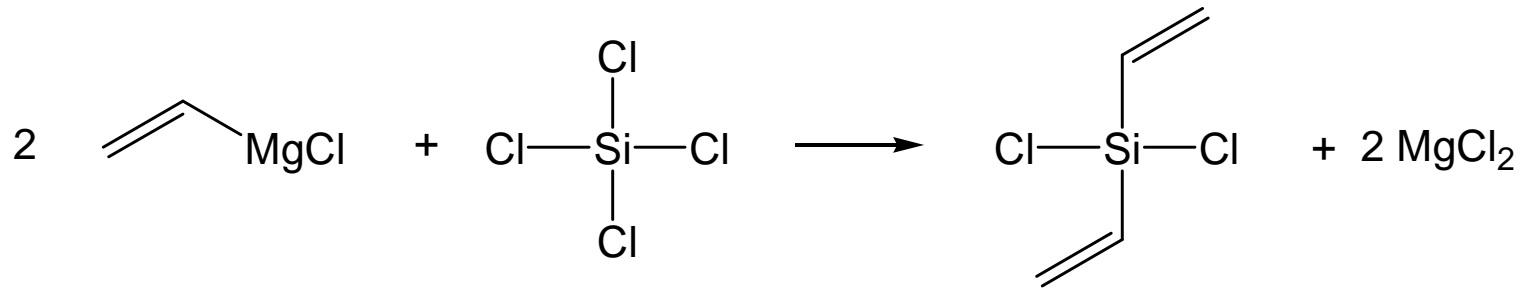
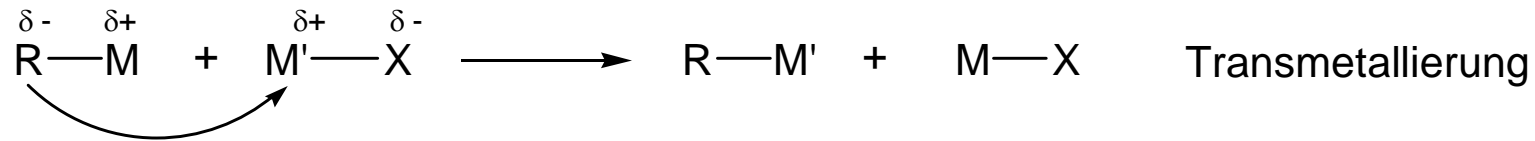
1-Methylethylmagnesiumbromid
"Grignard-Verbindung"

Strukturen:



Grignard-Verbindungen sind an Lösungsmittelmoleküle koordiniert.

Das Kohlenstoffatom in Alkylmetall-Verbindungen ist nucleophil:



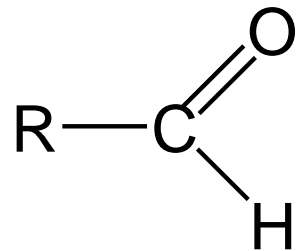
Alkohole, Ether, Aldehyde und Ketone



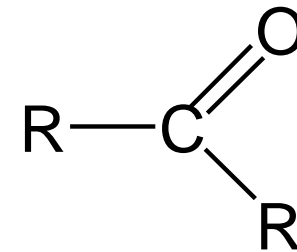
Alkohole



Ether



Aldehyde

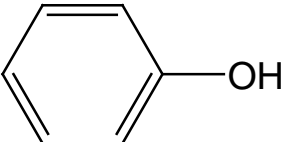


Ketone

Oxidationszahlen des Kohlenstoffs

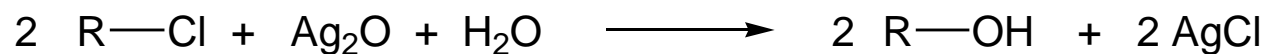
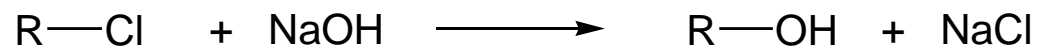
-4	-3	-2	-1	0	+1	+2	+3	+4
CH ₄		CH ₃ OH <i>Methanol</i>		CH ₂ O <i>Methanal</i>		HCOOH <i>Methansäure</i>		CO ₂
	RCH ₃		RCH ₂ OH <i>prim. Alkohol</i>		RCHO <i>Aldehyd</i>		RCOOH <i>Carbonsäure</i>	
		R ₂ CH ₂		R ₂ CHOH <i>sec. Alkohol</i>		R ₂ CO <i>Keton</i>		
			R ₃ CH		R ₃ COH <i>tert. Alkohol</i>			
				R ₄ C				

Alkohole und ihre Verwendung

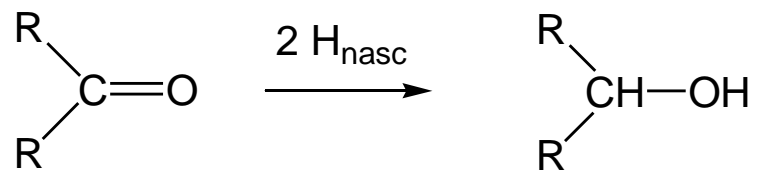
CH_3OH	Methanol	Lösungsmittel, Ausgangsprodukt für Formaldehyd, giftig
$\text{C}_2\text{H}_5\text{OH}$	Ethanol	Lösungsmittel, Ausgangsprodukt für Ether, alkoholische Getränke
$\text{C}_3\text{H}_7\text{OH}$	n-Propanol	Lösungsmittel
	i-Propanol	Acetonherstellung
$\text{HOH}_2\text{C}-\text{CH}_2\text{OH}$	Glykol	Polyesterkomponente, Gefrierschutzmittel, Lösungsmittel für Lacke
$\begin{array}{c} \text{H} \\ \\ \text{HOH}_2\text{C}-\text{C}-\text{CH}_2\text{OH} \\ \\ \text{OH} \end{array}$	Glycerin	Alkydharze, Dynamit, Weichmacher, Bestandteil der Fette
	Phenol	Zwischenprodukt der Farbstoff- und Polymersynthese

Synthesen einfacher Alkohole

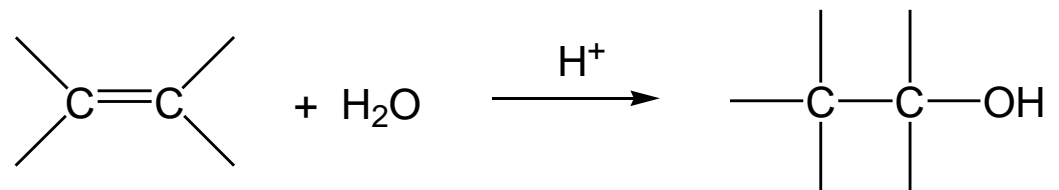
Hydrolyse von Halogenalkanen



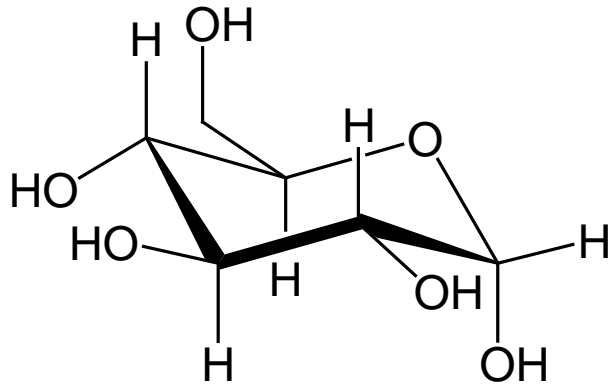
Reduktion von Ketonen



Addition von Wasser an Alkene

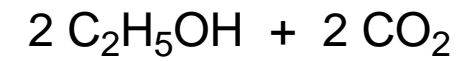


Alkoholische Gärung

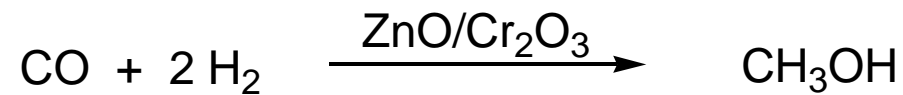


$C_6H_{12}O_6$ (D-Glucose)

Zymase

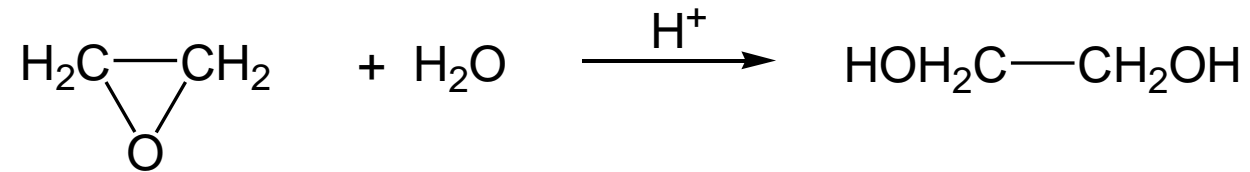


Technische Methanolsynthese

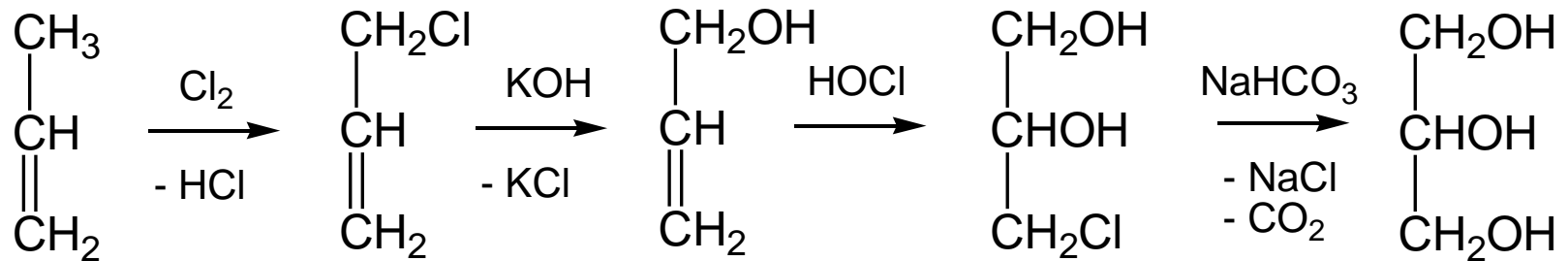


Synthese mehrwertiger Alkohole

Glykol (1,2-Ethandiol)

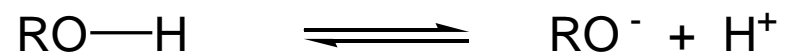


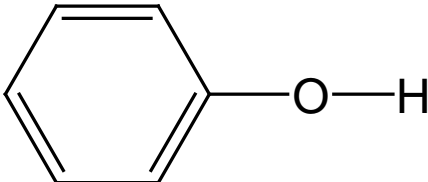
Glycerin (Propantriol)



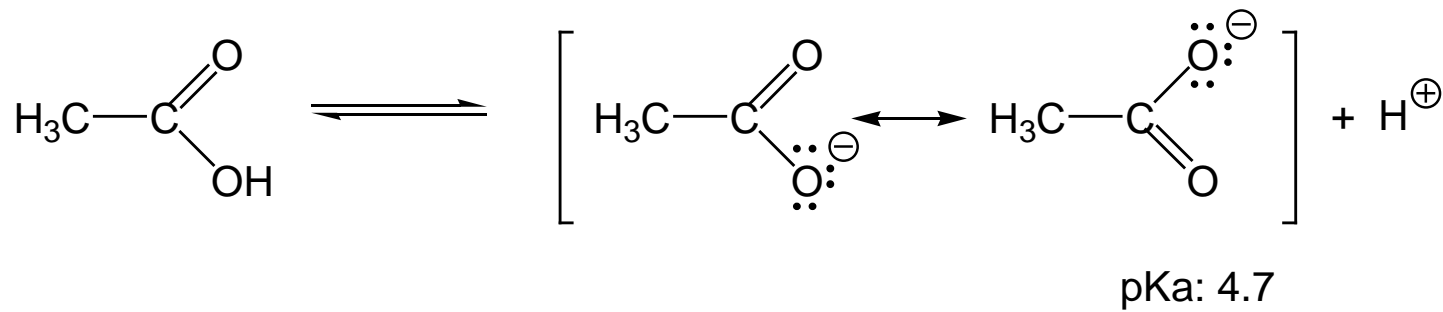
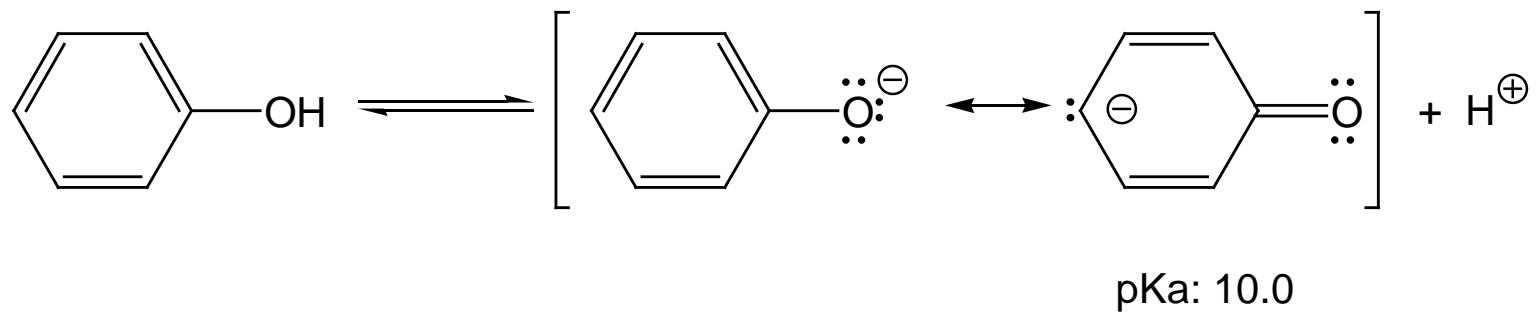
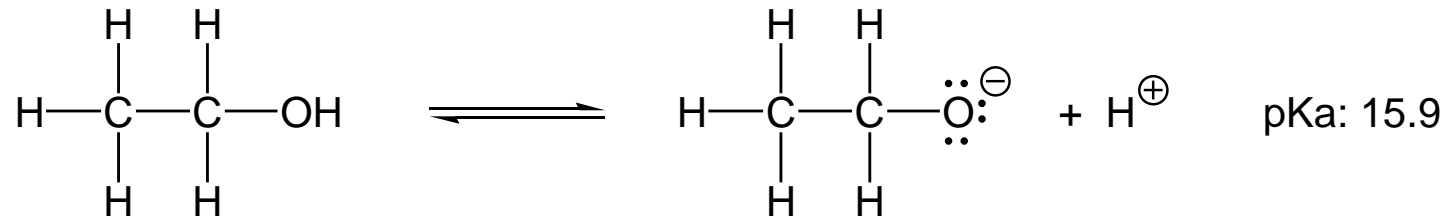
Acidität von Alkoholen

Alkohole sind wie auch Wasser schwache Säuren.

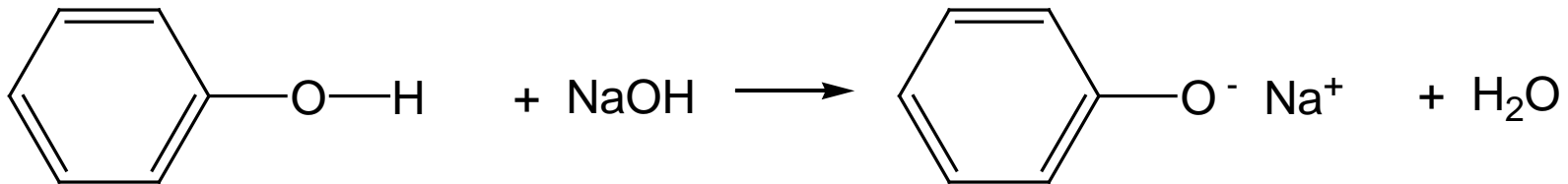
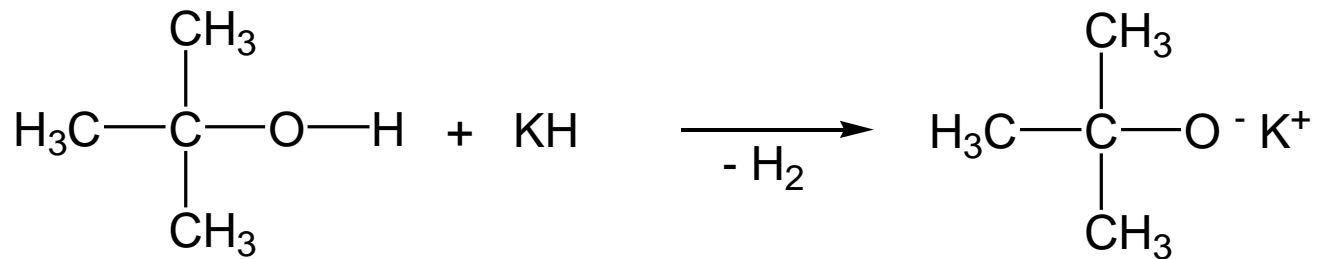
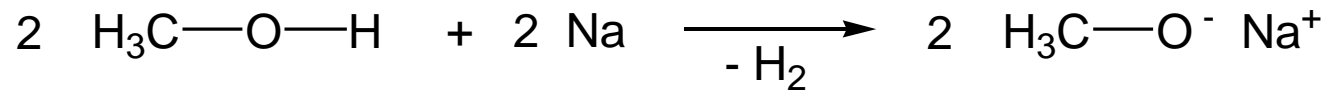


	pKa		
HO—H	14.0	(H ₃ C) ₃ CO—H	18.0
H ₃ CO—H	15.5	F ₃ CH ₂ CO—H	12.4
C ₂ H ₅ O—H	15.9		10.0

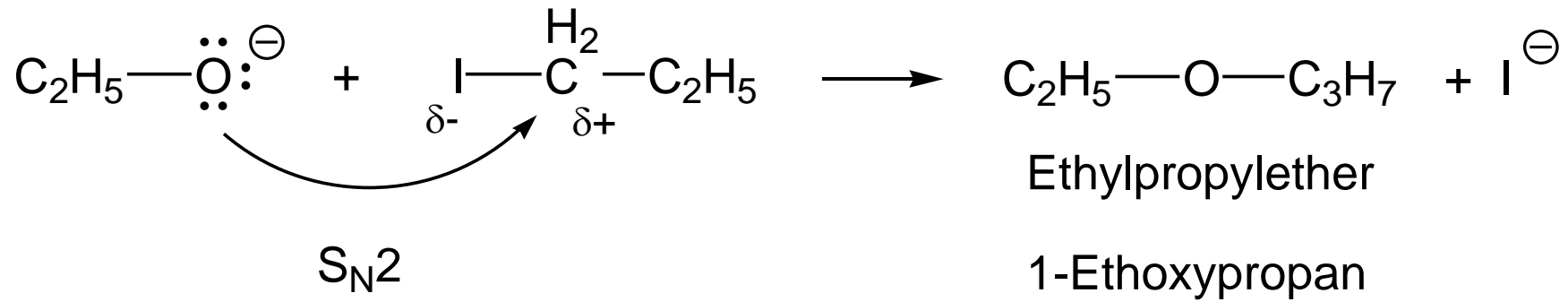
Abhängigkeit der Säurekonstante von der Konstitution



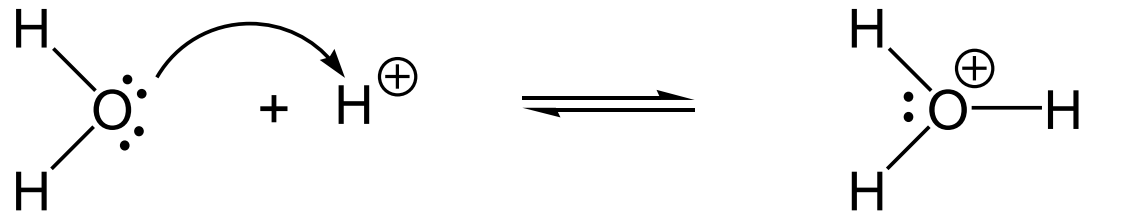
Darstellung von Alkoholaten



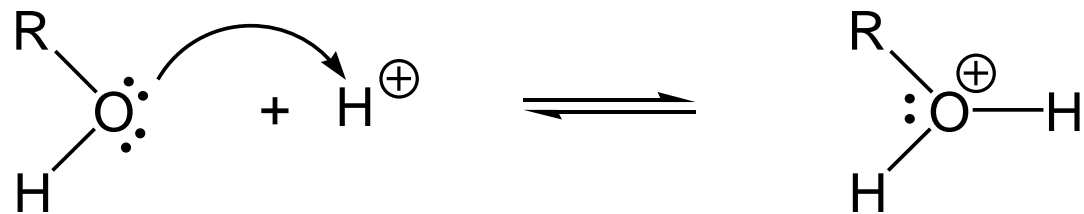
Williamson-Ethersynthese



Basizität von Alkoholen

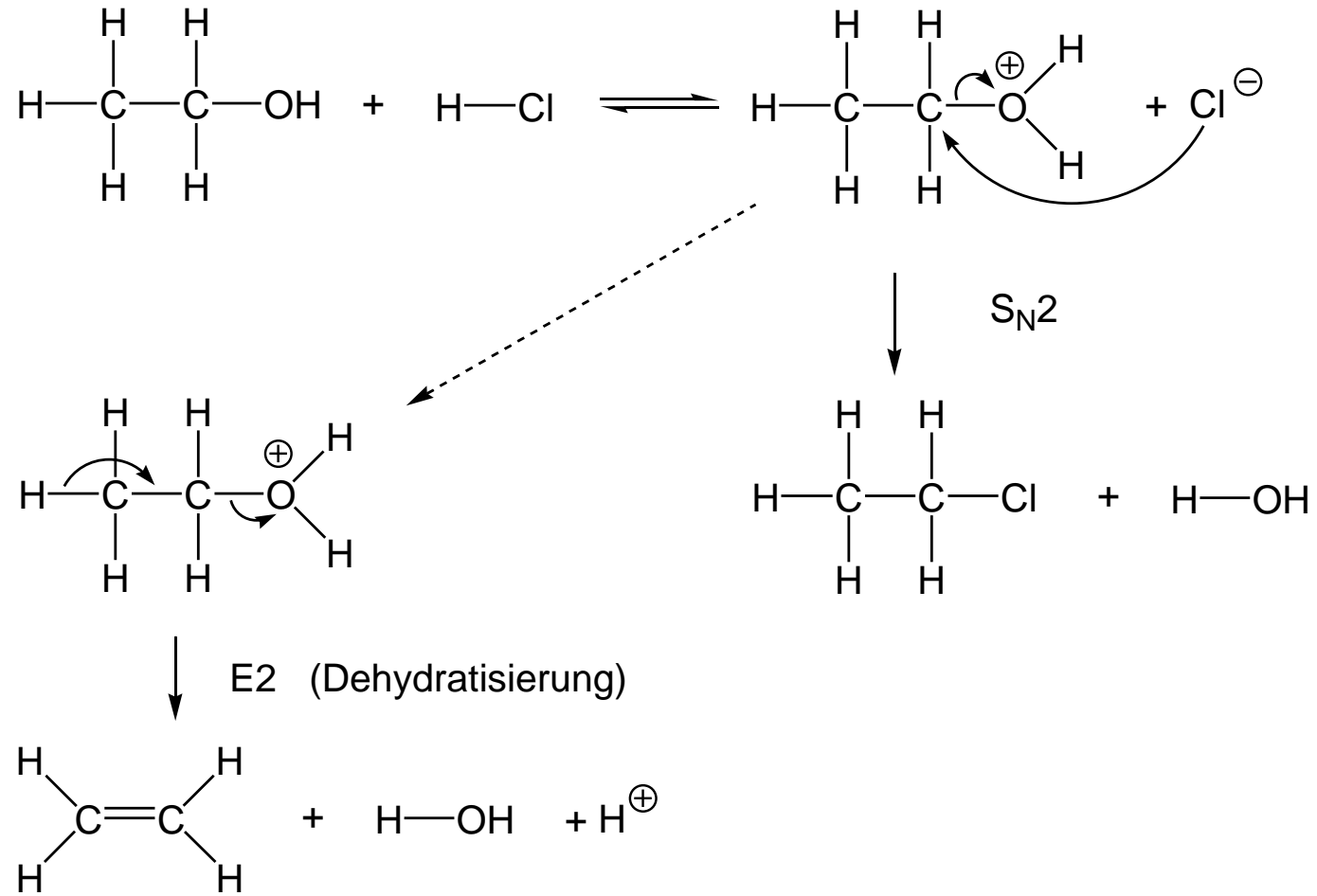


Hydronium-Ion

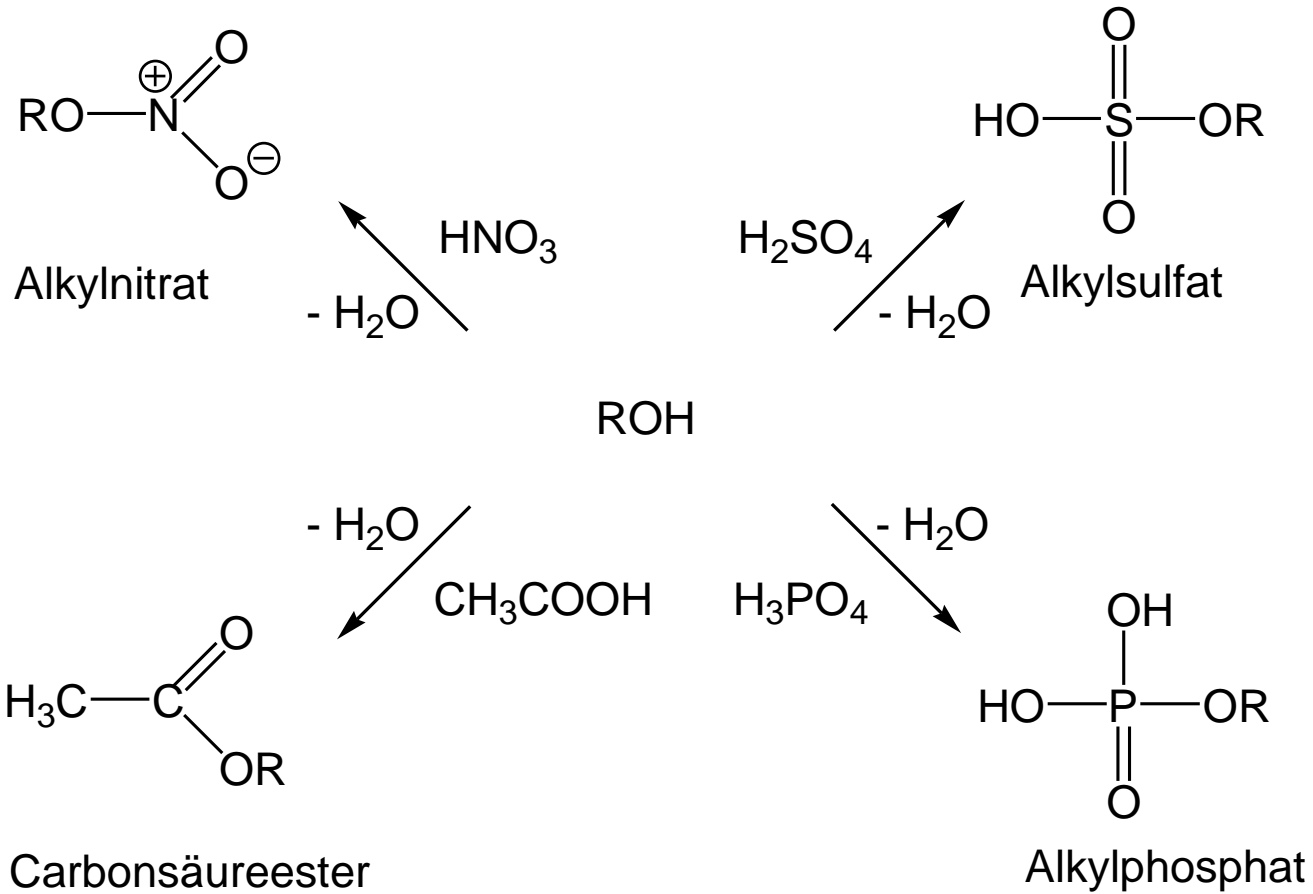


Alkoxonium-Ion

Reaktion von Alkohol mit Halogenwasserstoffen



Säureester



Oxidation von Alkoholen

