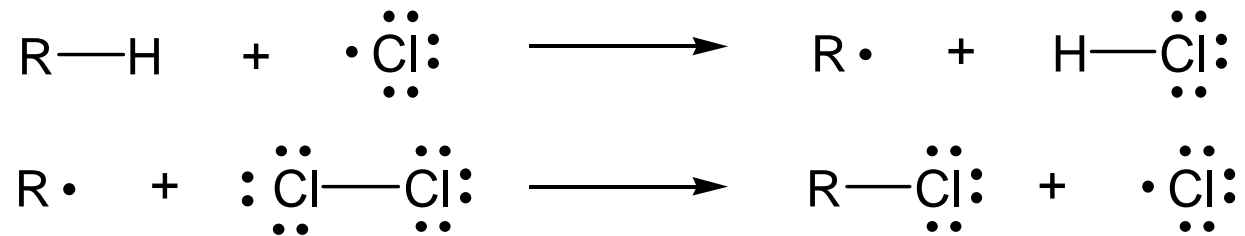
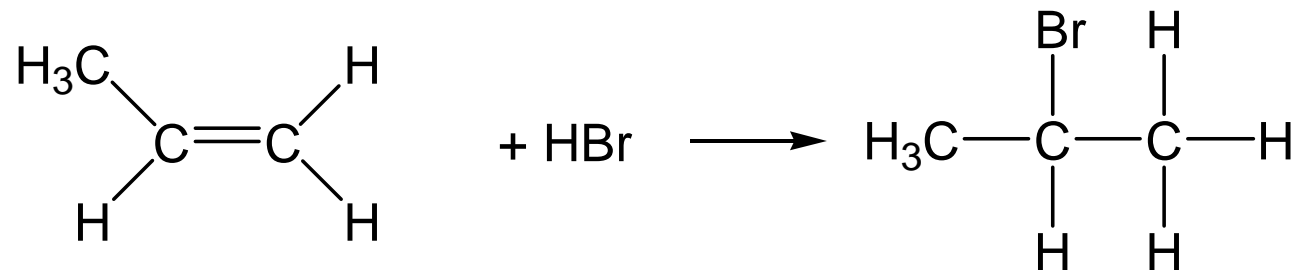


Halogenalkane

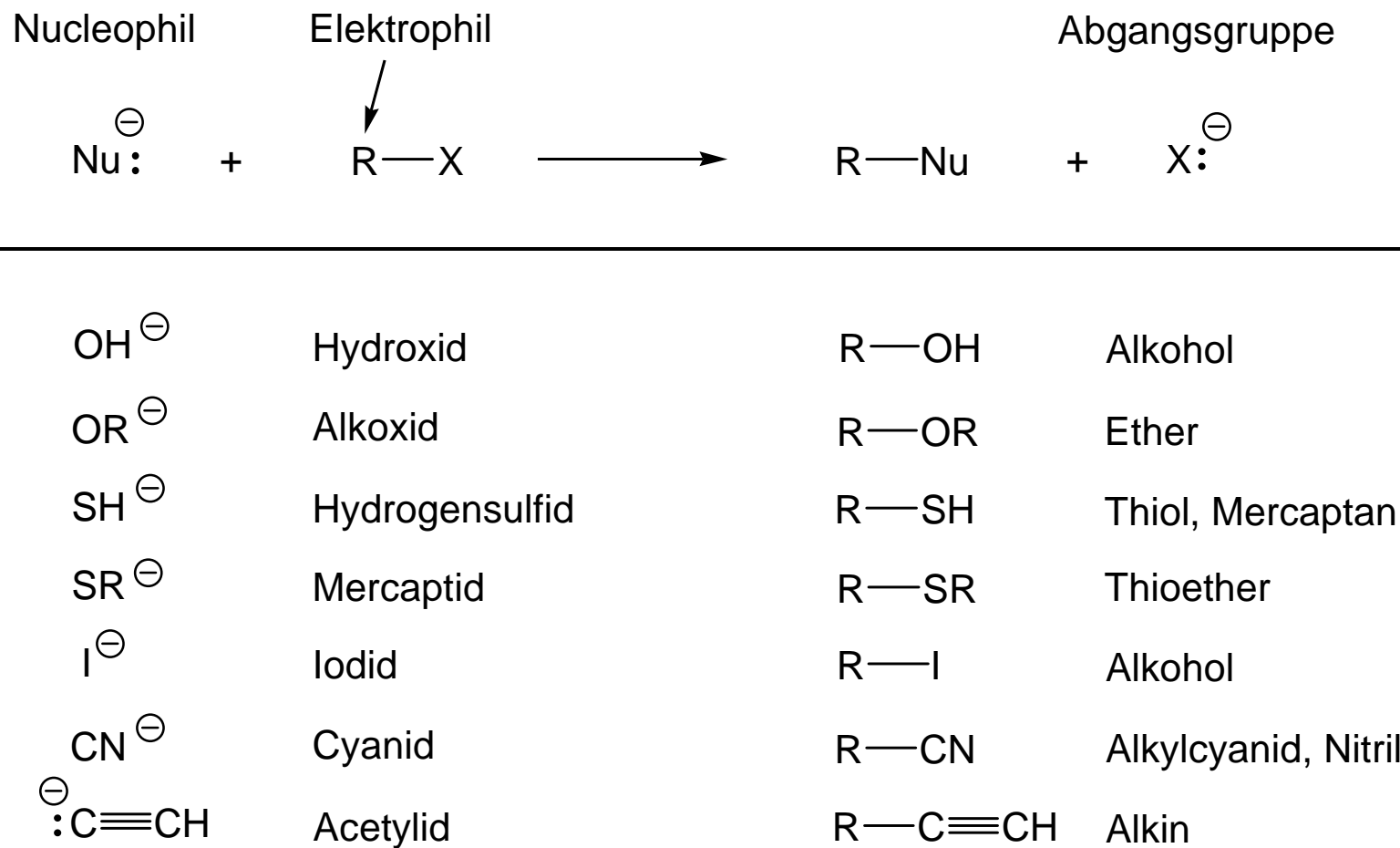
Herstellung: Radikalische Halogenierung von Alkanen

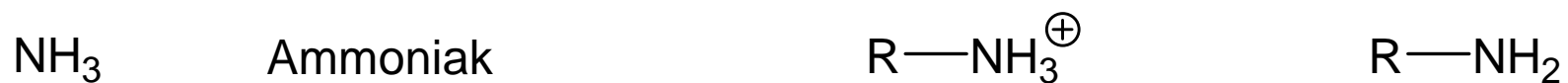
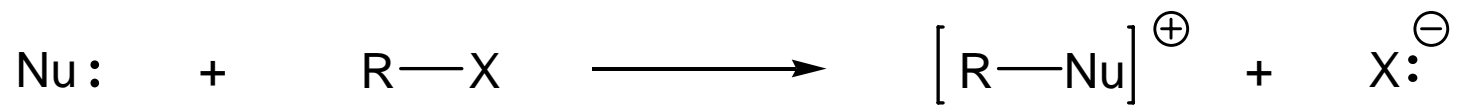


Addition von Halogenwasserstoffen an Alkene

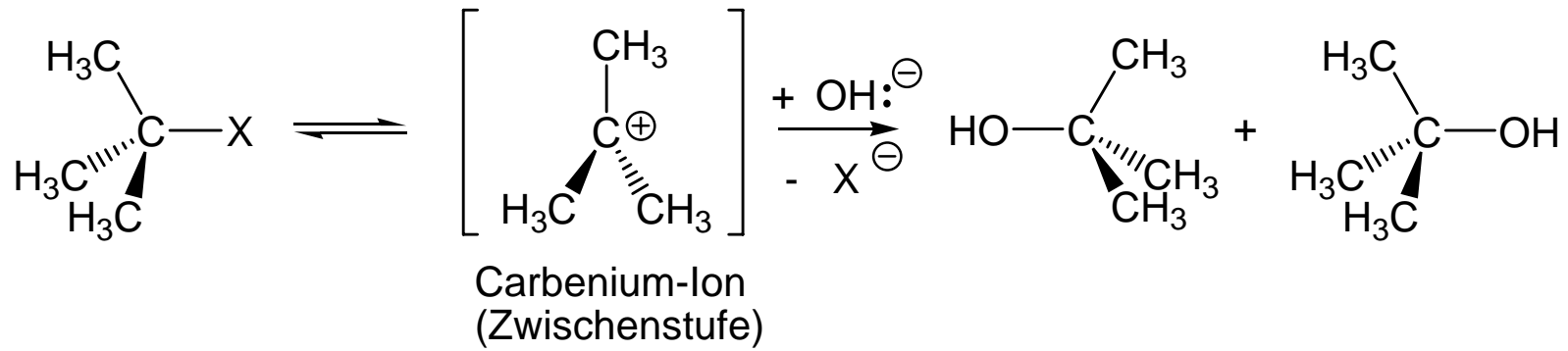


Nucleophile Substitution an Alkylhalogeniden

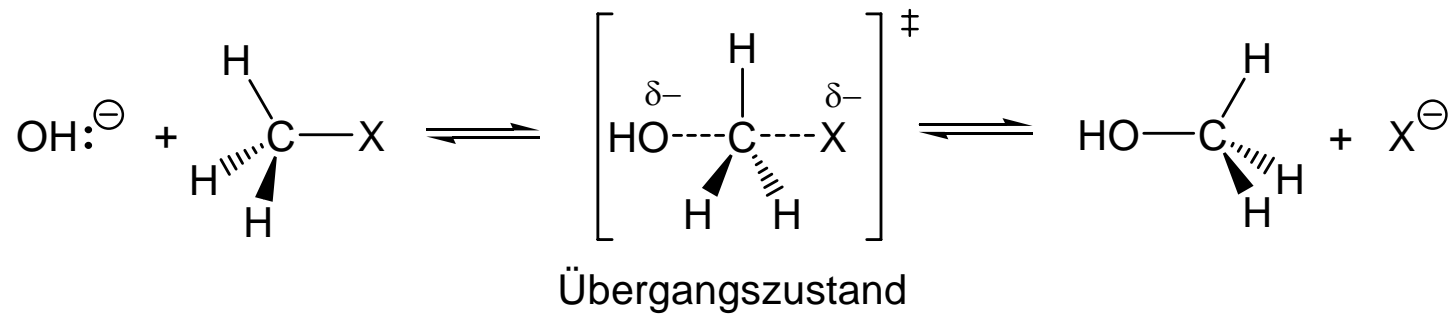




S_N1-Mechanismus

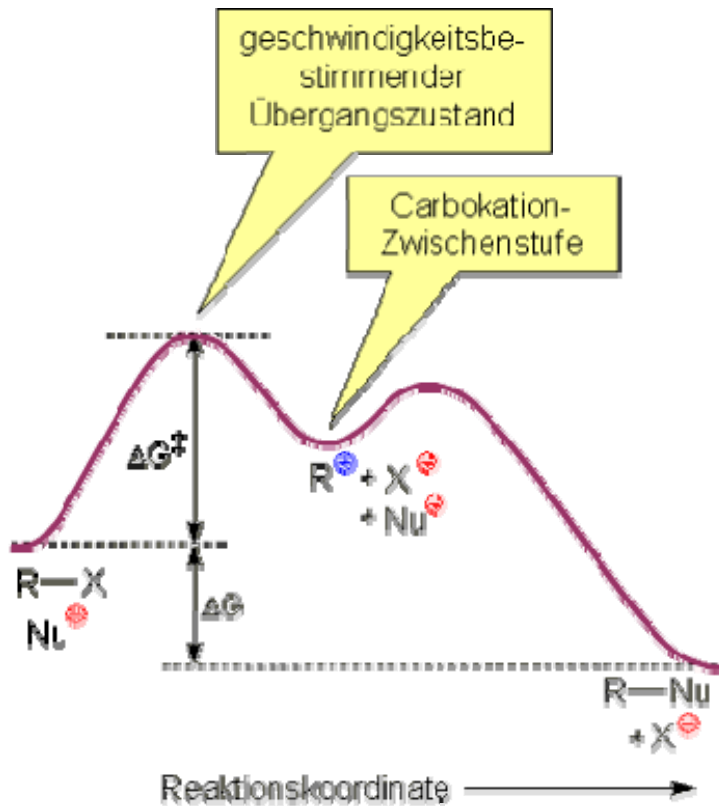


S_N2-Mechanismus

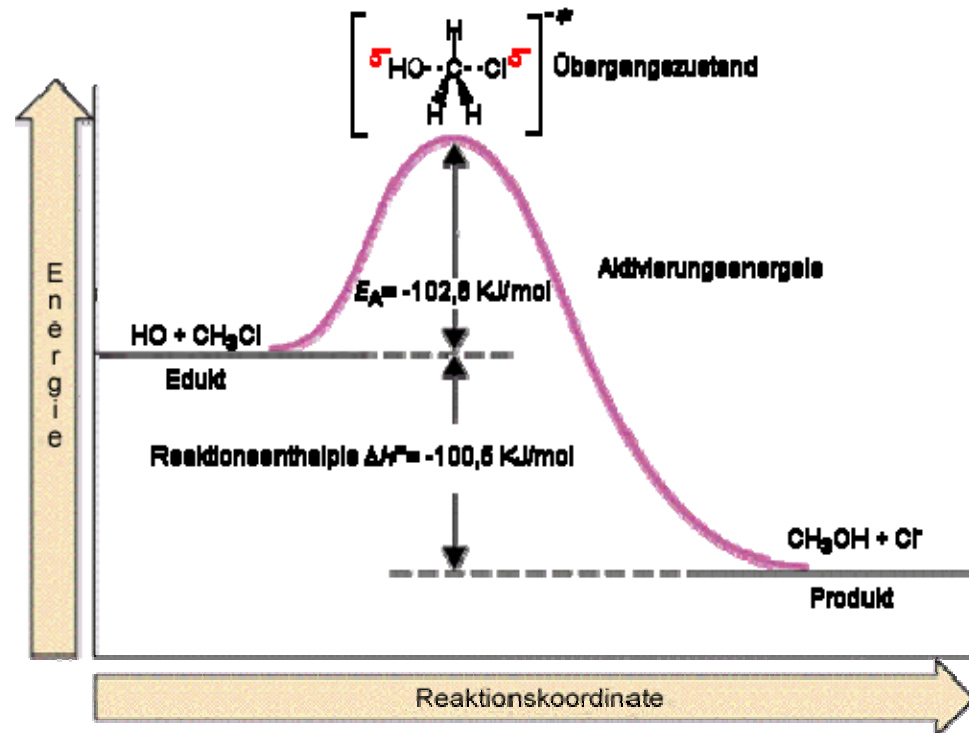


Energieprofile

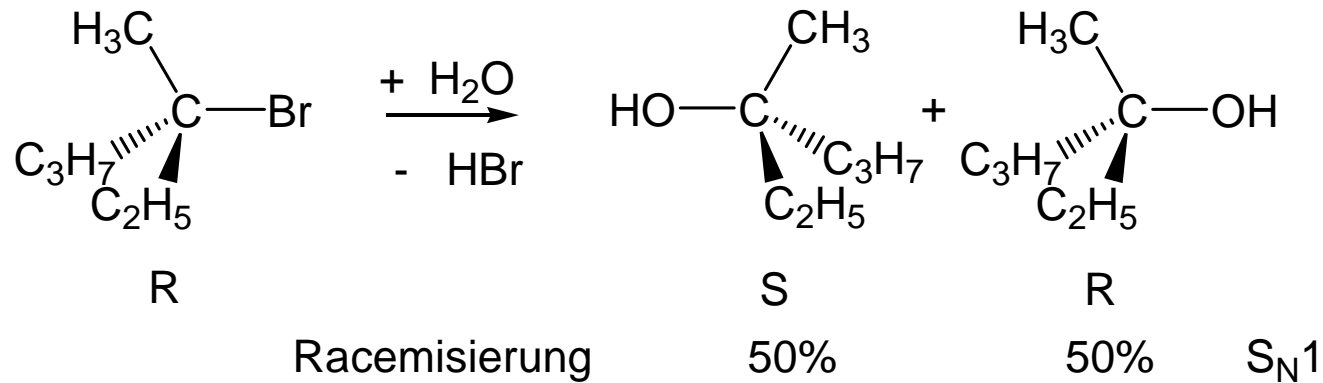
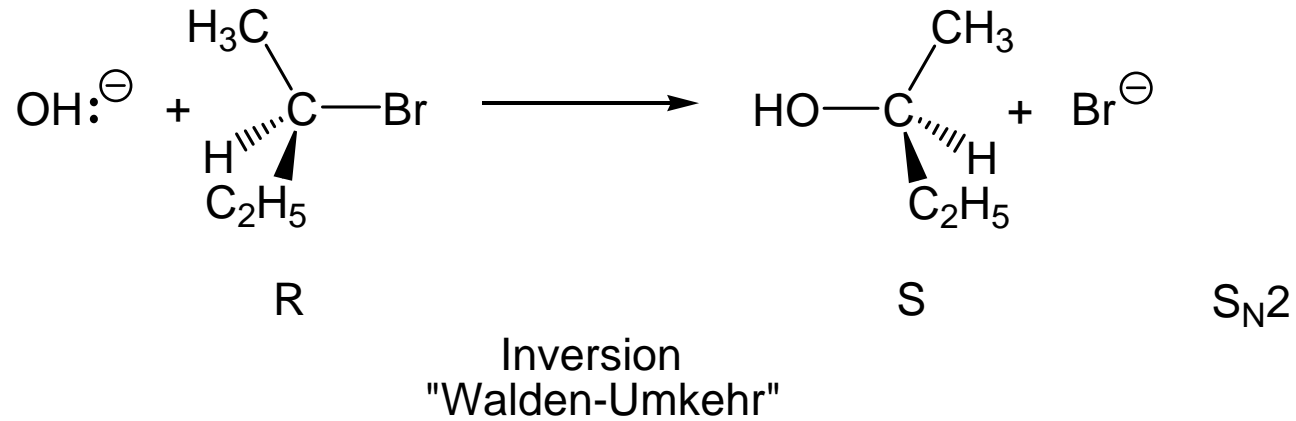
S_N1-Mechanismus



S_N2-Mechanismus



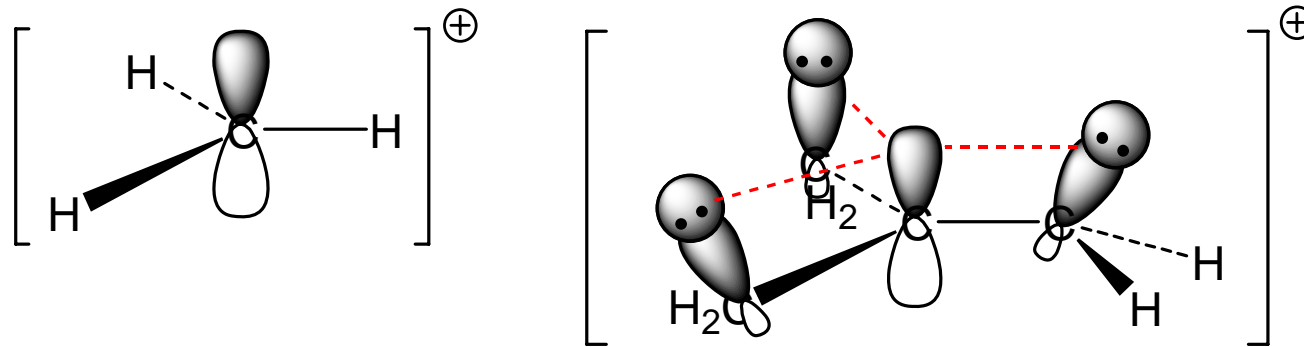
Einfluss des Reaktionsmechanismus auf die optische Aktivität



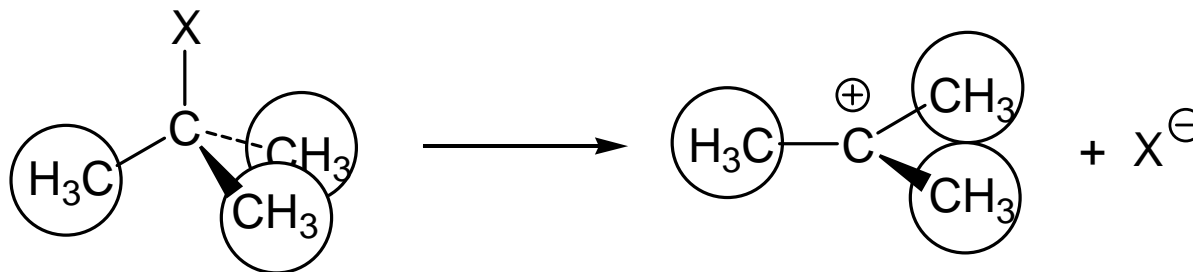
Vergleich der Mechanismen der nucleophilen Substitution

	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

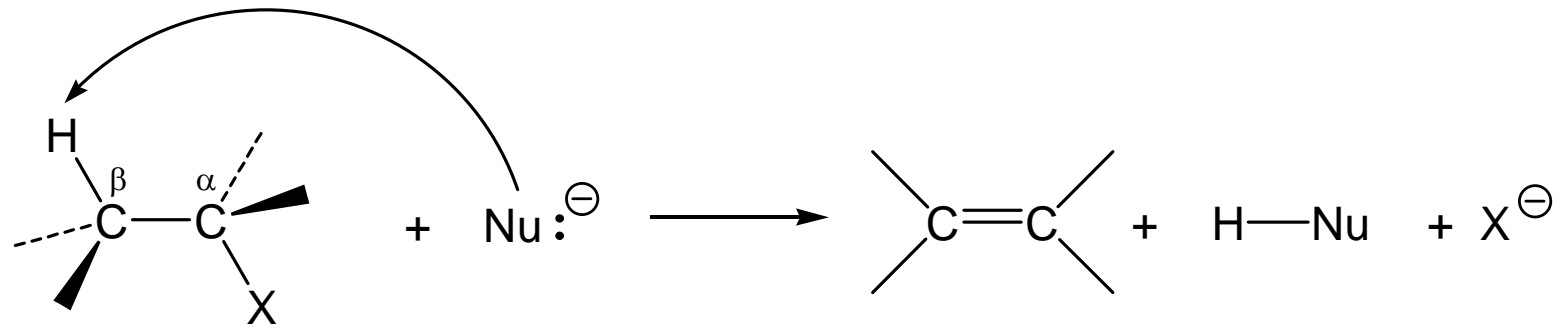


Tertiäre Carbenium-Ionen werden durch **Hyperkonjugation** stabilisiert.

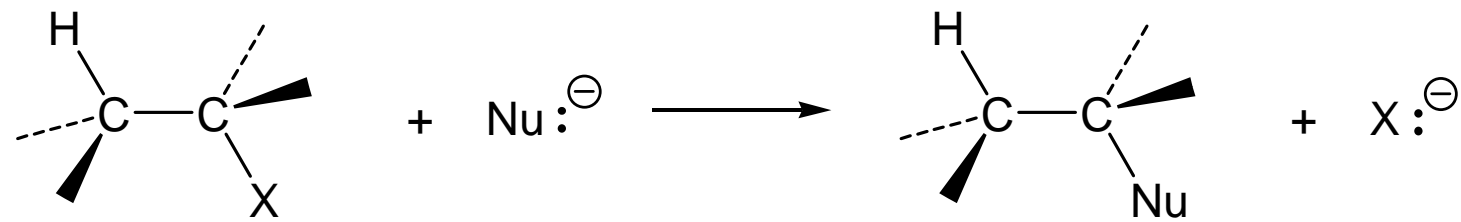


Die Dissoziation eines tert. Halogenalkans vermindert die sterische Spannung.

Die 1,2-Eliminierung



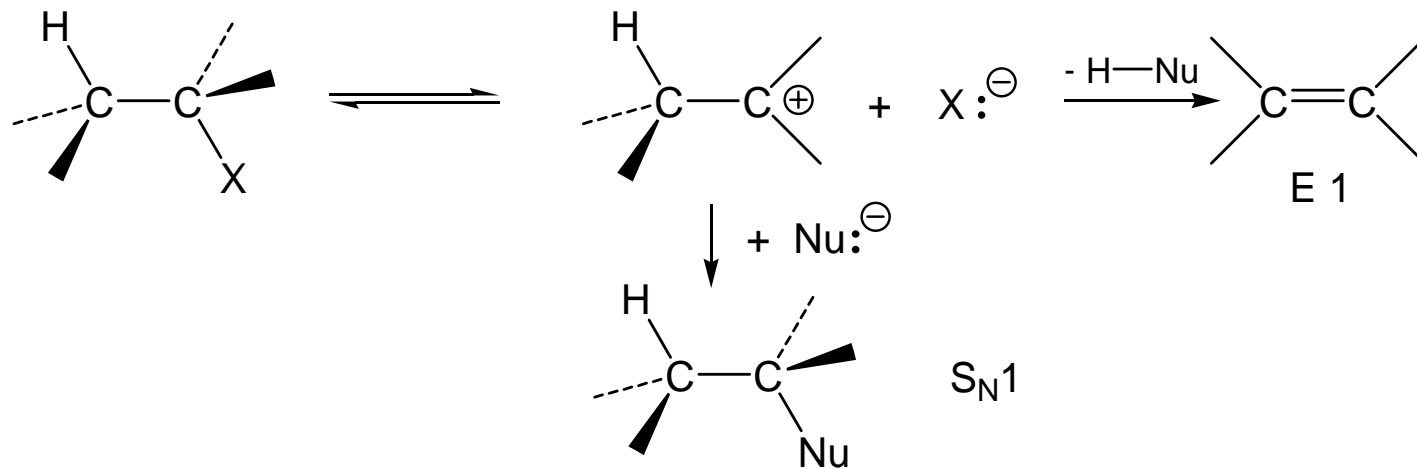
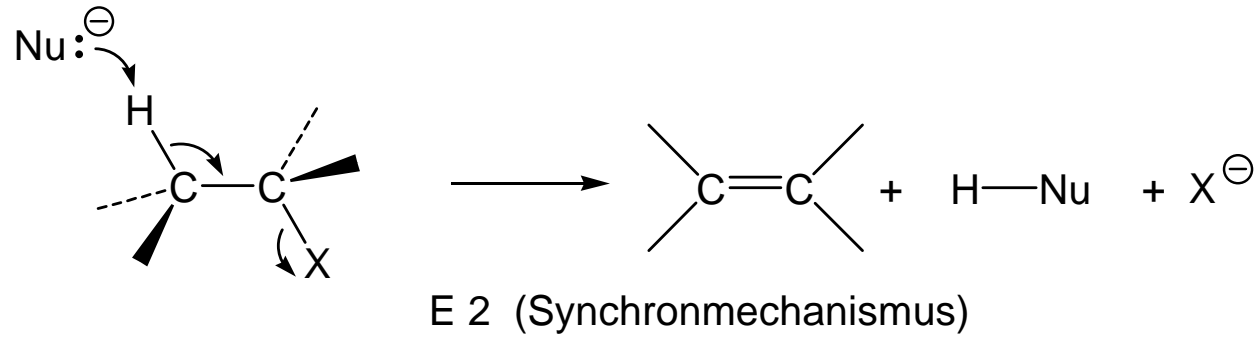
Eliminierung



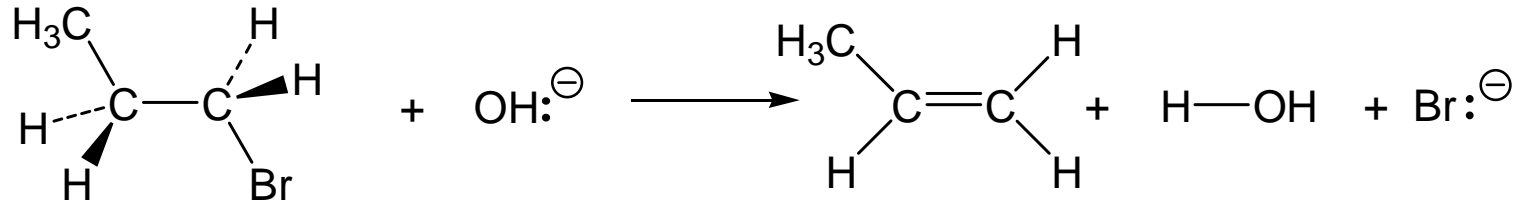
Substitution

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

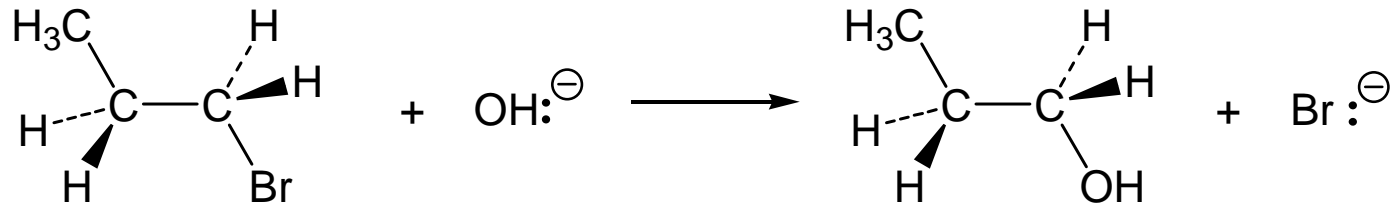
Die Mechanismen der Eliminierung



E 2 oder S_N2 ?

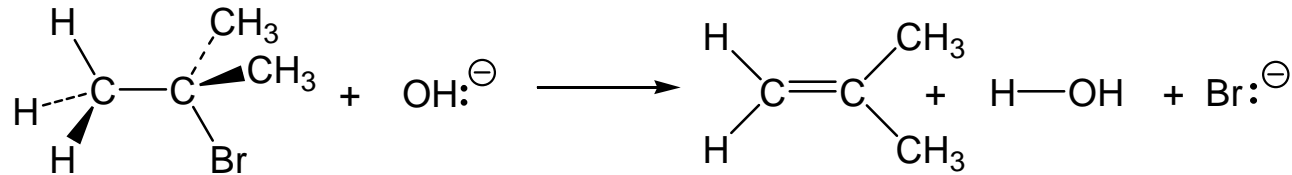


- unpolares Lösungsmittel
- hohe Basekonzentration
- hohe Temperatur

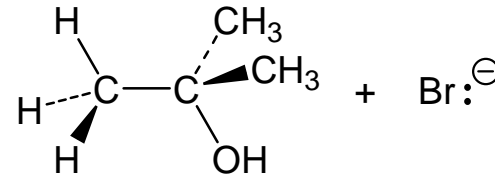


- polares Lösungsmittel
- niedrige Basekonzentration
- niedrige Temperatur

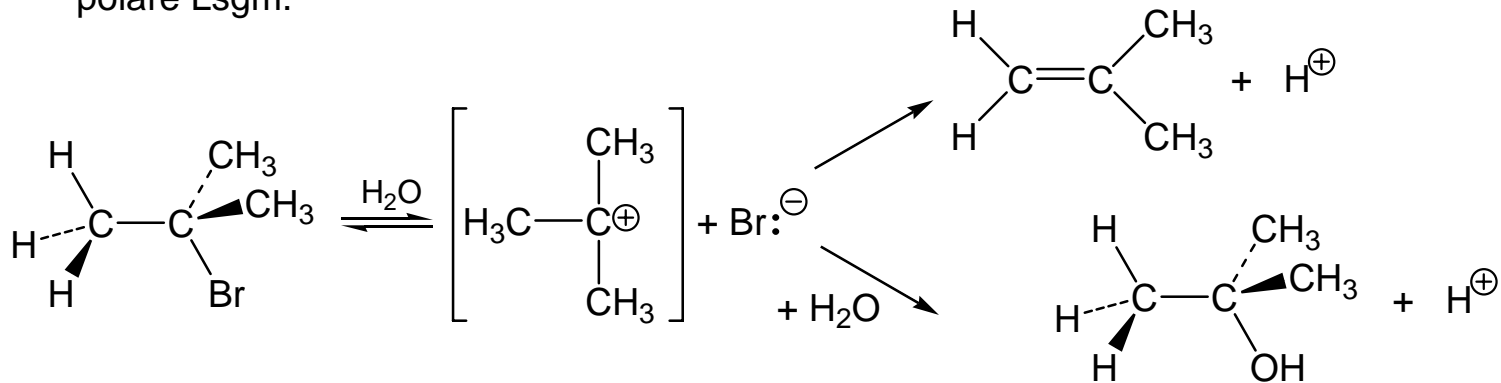
E1 oder S_N1 ?



E1: starke Base
unpolare Lsgm.

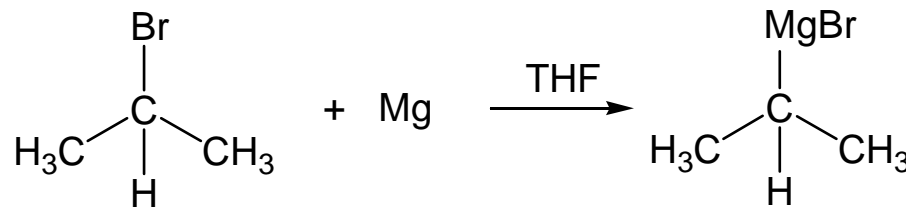
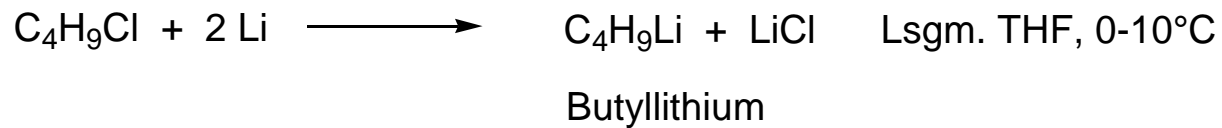
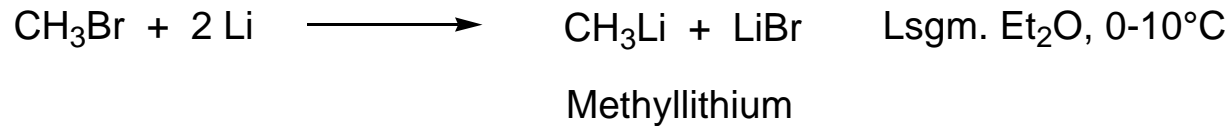


S_N1: schwache Base
polare Lsgm.



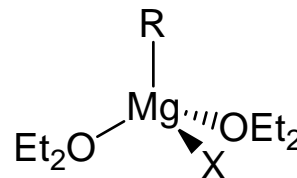
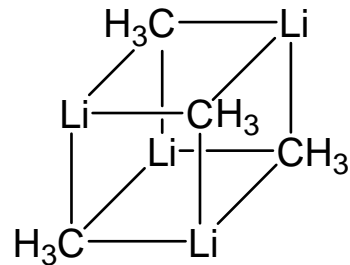
Die Eliminierung kann bei tertiären Alkanen nie ausgeschlossen werden.

Organolithium- und Organomagnesiumverbindungen



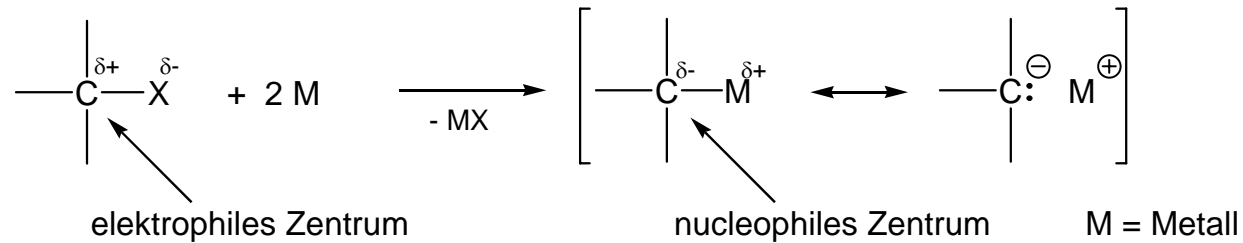
1-Methylethylmagnesiumbromid
"Grignard-Verbindung"

Strukturen:

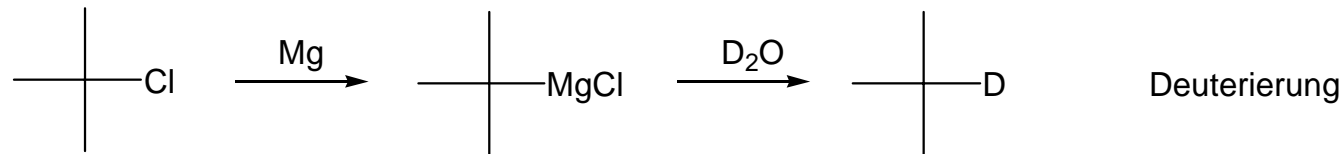
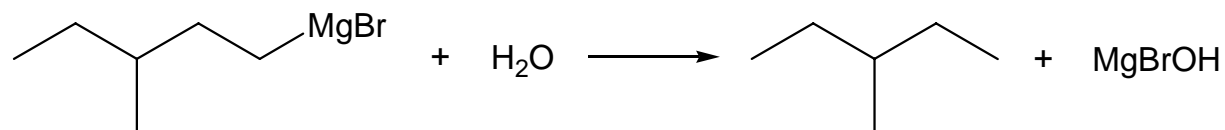
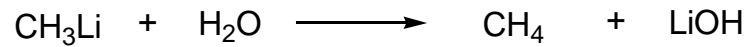
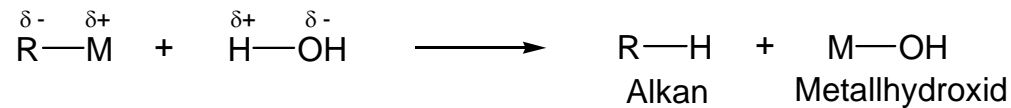


Grignard-Verbindungen sind an Lösungsmittelmoleküle koordiniert.

Das Kohlenstoffatom wird durch Metallierung „umgepolt“



Die Alkylgruppe in Alkylmetall-Verbindungen reagiert basisch:



Das Kohlenstoffatom in Alkylmetall-Verbindungen ist nucleophil:

