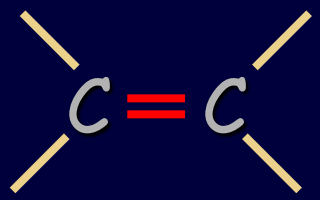
Bölüm 3: Alkenler



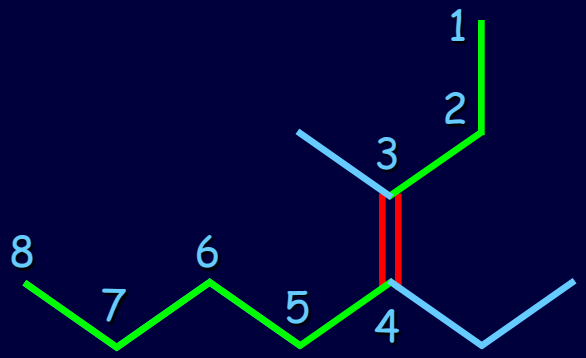
Çift bağ

Adlandırma: Sonek – an ⟶ – en

Örnek: Eten, propen, büten, vd.

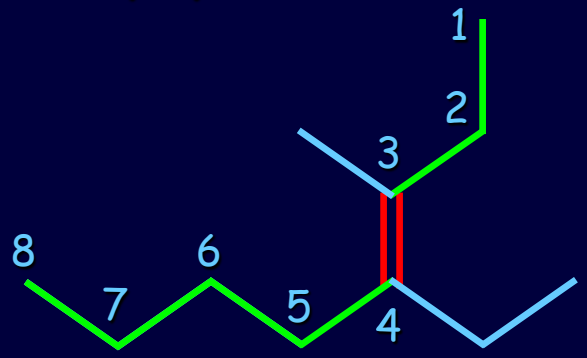
IUPAC Kuralları:

1. Çift bağın her iki karbonunu da içerene en uzun zincir belirlenir.



Bir Okten türevi

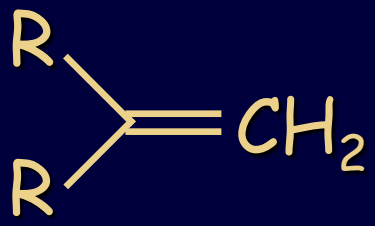
2. Numaralandırma C=C bağı uç kısma yakın olacak şekilde yapılır



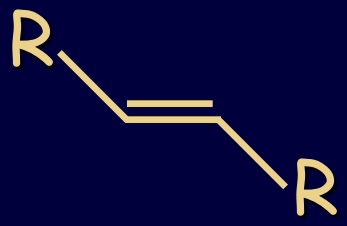
3-Okten – Kök adı

(Csp2 lerden sadece uca yakın olanın numarası yazılır)

Çift bağın konumu



Uç alken

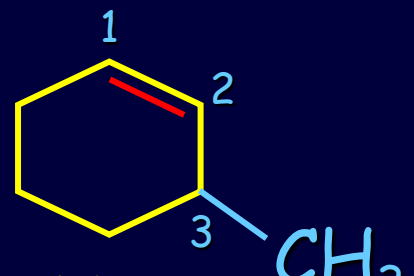


İç alken

3. Sübstitüent adları numaralarıyla ön-ek olarak kök adının önüne konularak adlandırma tamamlanır

4-Etil-3-metil-3-okten

4. Sikloalkanlar



3-Metilsiklohekzen

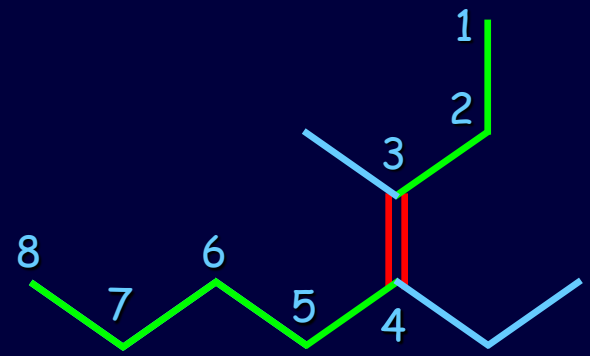
Numaralandırma çift bağdan başlar

5. Stereoizomerler:

Cis/trans 1,2-disübstitüe etenler için kullanılır.

6. Tri- ve tetrasübstitüe alkenler: E, Z adlandırması.

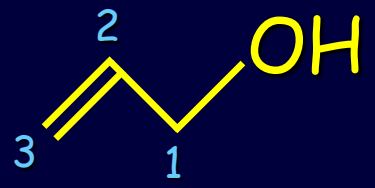
Her bir sp^2-karbonu için R, S büyüklük kuralı, öncelikli karbonları bulmak için kullanılır.



E izomer : karşı yönler
Z izomer : Aynı yönler

E-4-etil-3metil-3-okten

7. – OH (–SH) > – en



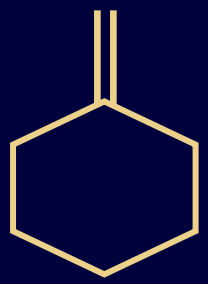
2-Propen-1-ol

8. Sübstitüent: Alkenil

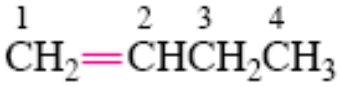
$CH_2=CH-$ Etenil (vinil)

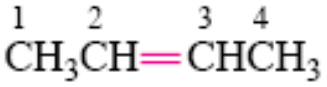
$CH_2=CH-CH_2-$ 2-Propenil (allil)

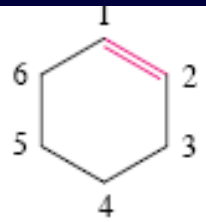
9. Ekzosiklik alkenler: Alkilidensikloalkanlar



Metilidenesiklohekzan
(Metilenesiklohekzan)





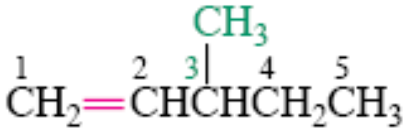


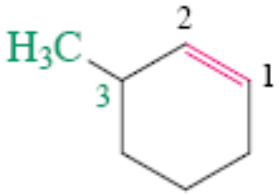
1-Büten
(Uç alken;
3-büten değil)

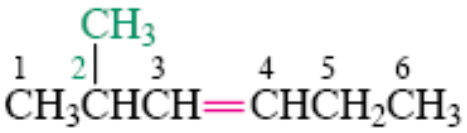
2-Büten
(İç alken ve
1-bütenin ikili
bağ izomeri)

2-Penten
(3-penten değil)

Sikloheksen



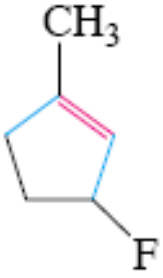


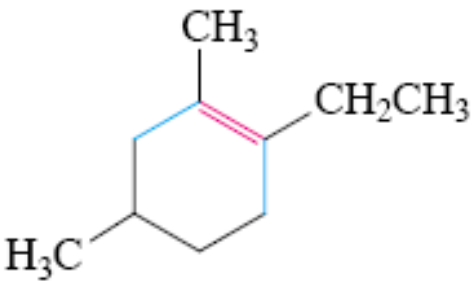


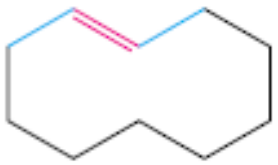
3-Metil-1-penten

3-Metilsikloheksen
(6-metilsikloheksen değil)

2-Metil-3-heksen
(5-metil-3-heksen değil)

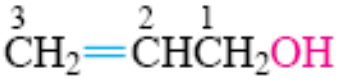


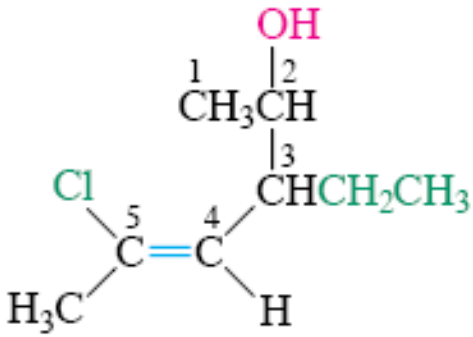


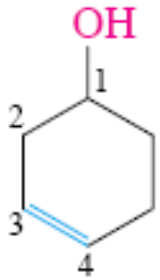


3-Flor-1-metilsiklopenten **1-Etil-2,4-dimetilsikloheksen** ***trans*-Siklodeken**

(İlk ikisinde sadece cis izomer kararlıdır)





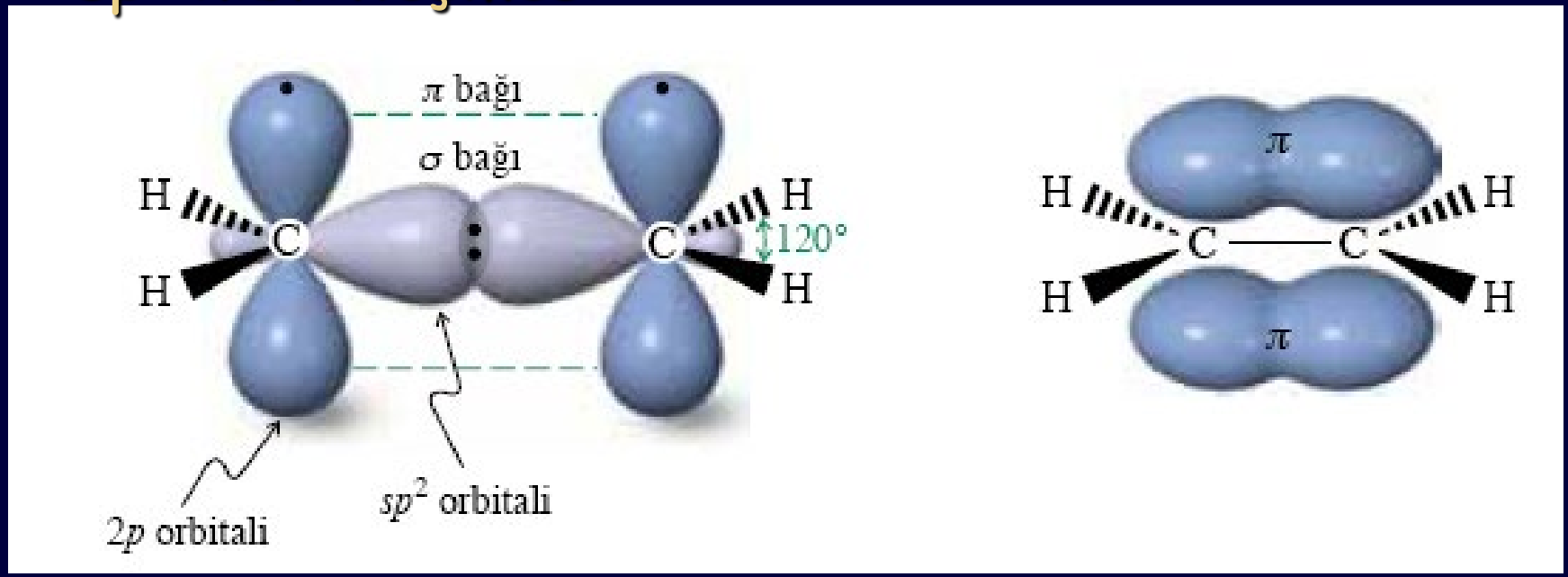


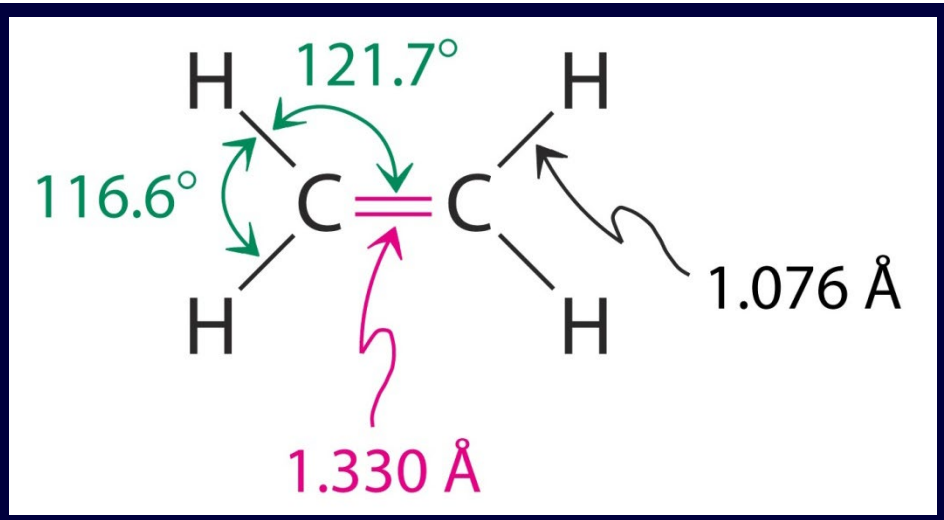
2-Propen-1-ol **(Z)-5-Klor-3-etil-4-heksen-2-ol** **3-Sikloheksen-1-ol**

(1-propen-3-ol değil) (İki stereomerkez tanımlanmamıştır) (1-Cycloheksen-4-ol değil)

Çift Bağın Yapısı

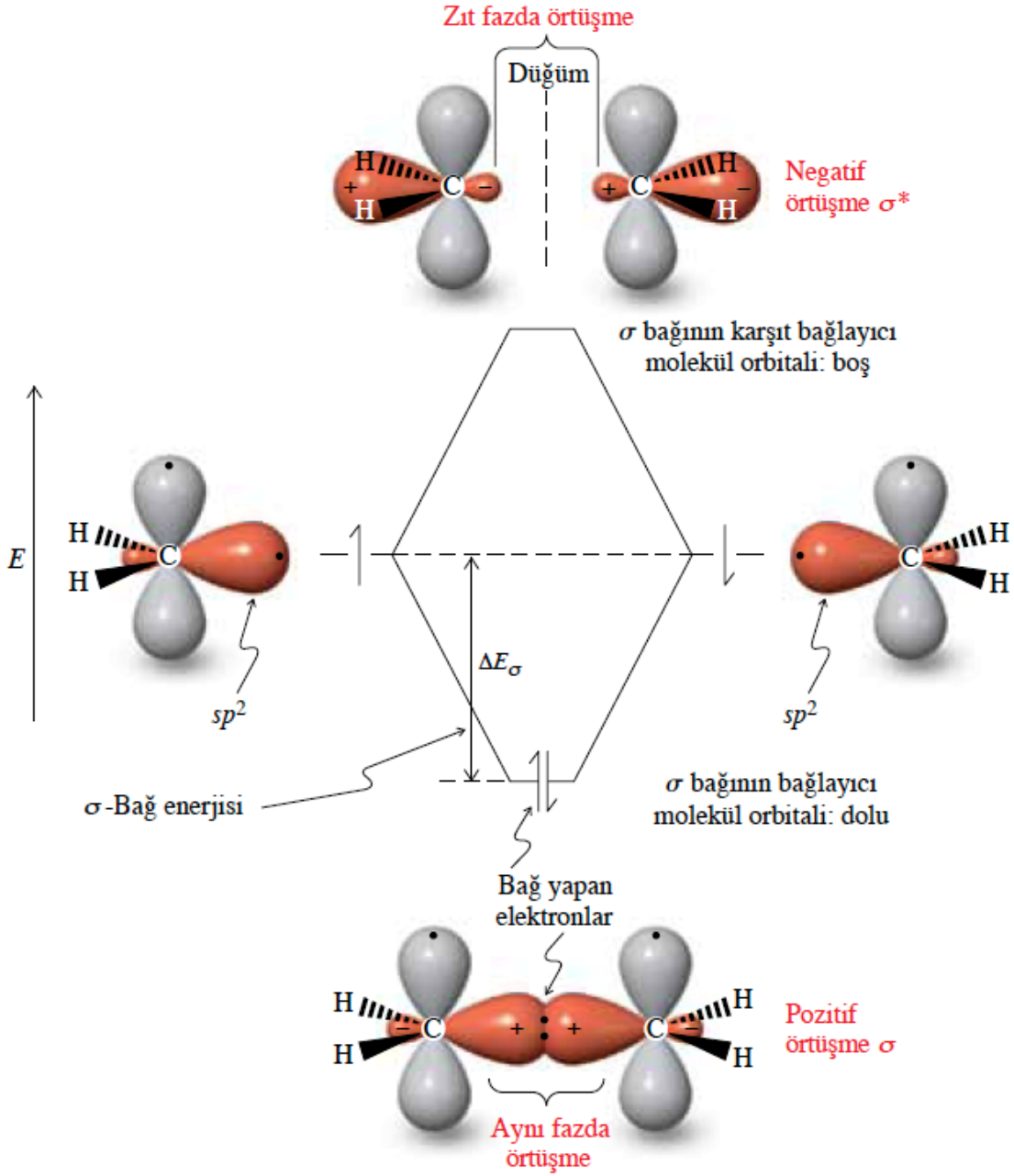
sp^2 hibritleşmesi



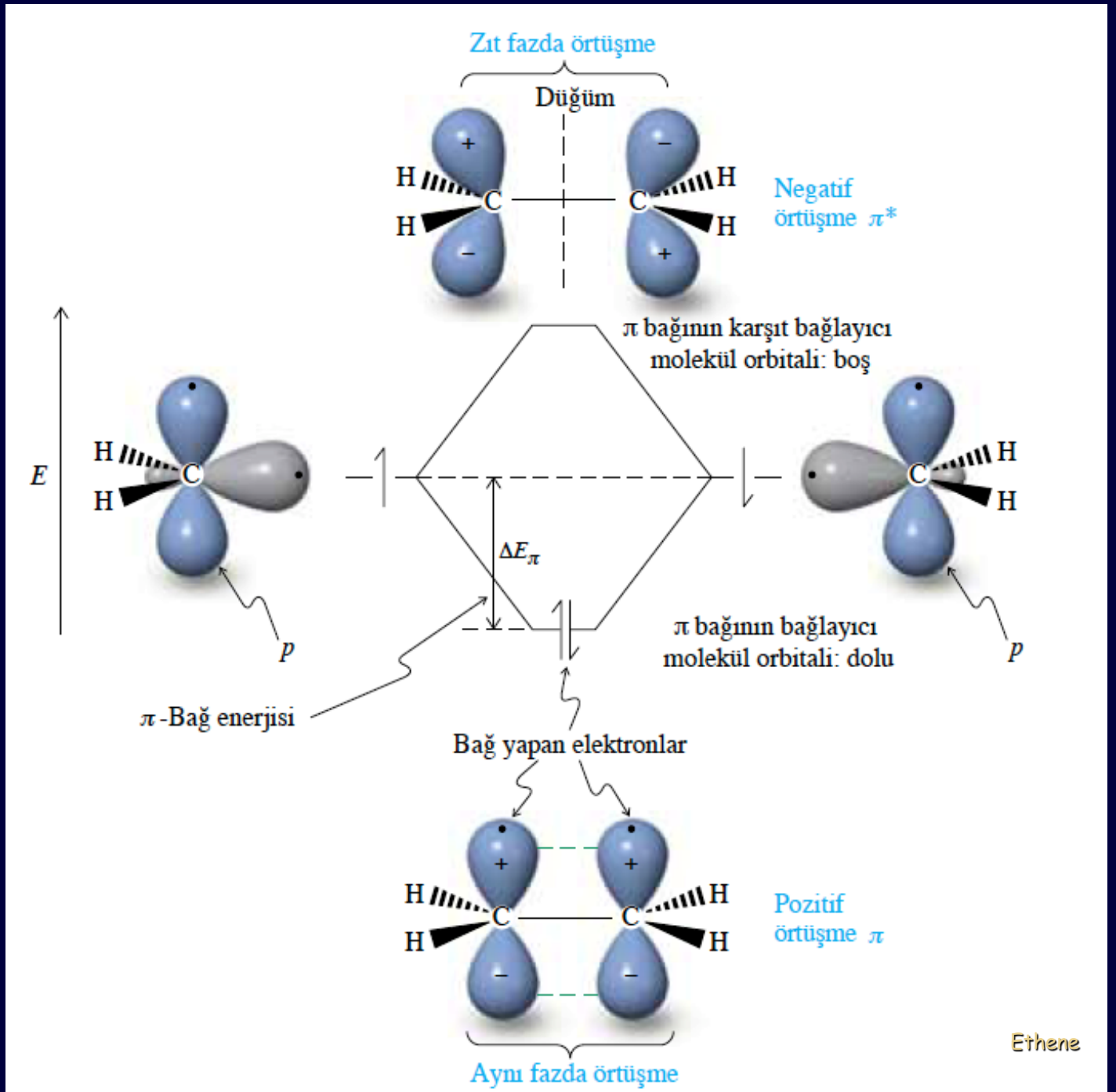


"Elektronca zengin"

Sigma Bağı Oluşumu

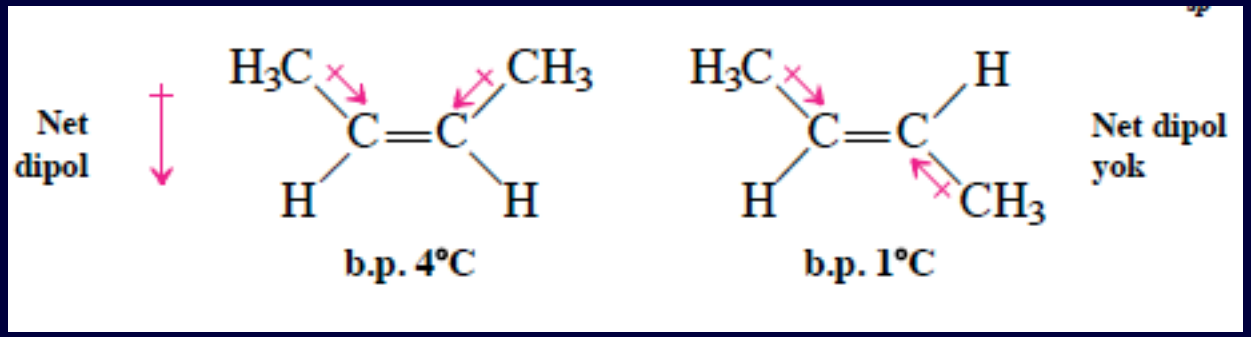


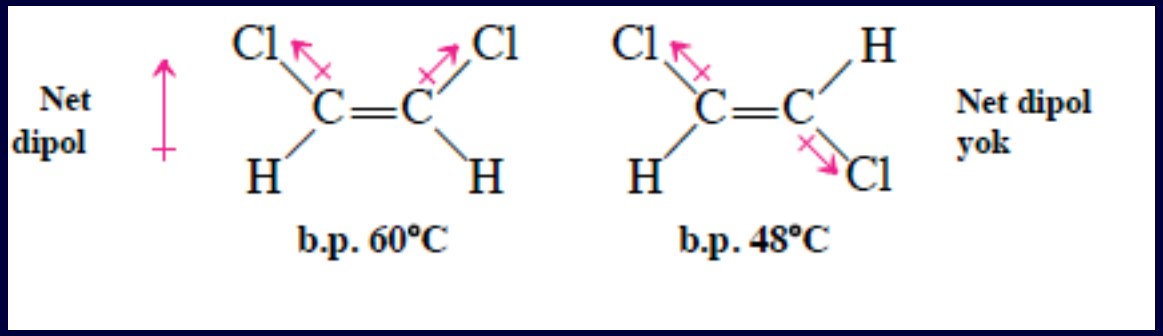
Pi Bağı


Zıt fazda örtüşme
Düğüm
Negatif
örtüşme π*
π bağının karşıt bağlayıcı
molekül orbitali: boş
E
ΔEπ
π bağının bağlayıcı
molekül orbitali: dolu
p
p
π-Bağ enerjisi
Bağ yapan elektronlar
Pozitif
örtüşme π
Aynı fazda örtüşme
Ethene

Alkenlerin Fiziksel Özellikleri

Alkenlerdeki Polarlanma: C_{sp^2} , C_{sp^3} ten Elektron Çeker





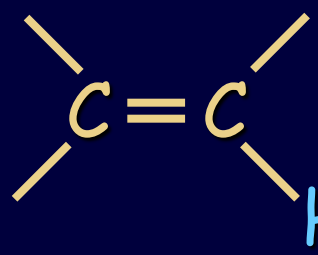
Çizelge 11-1

Alken ve Alkanların Erime Noktalarının Karşılaştırılması

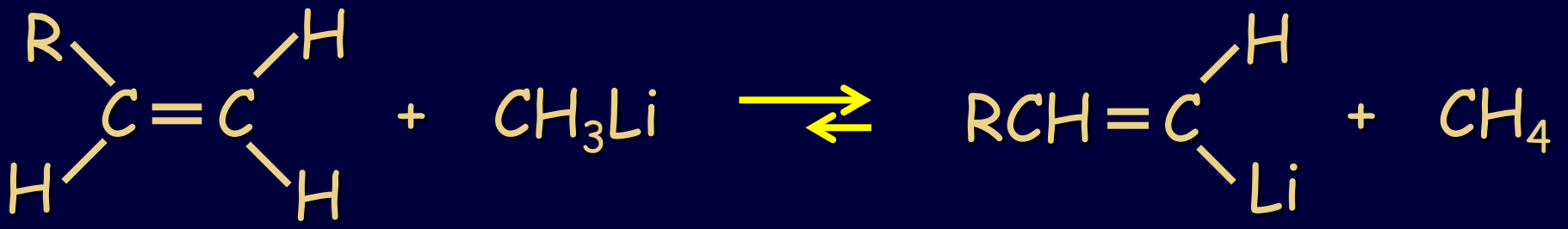
Bileşik	Erime noktası (°C)
Bütan	−138
trans-2-Büten	−106
cis-2-Büten	−139
Pentan	−130
trans-2-Penten	−135
cis-2-Penten	−180
Heksan	−95
trans-2-Heksen	−133
cis-2-Heksen	−141
trans-3-Heksen	−115
cis-3-Heksen	−138

Alkenlerin Fiziksel Özellikleri

Asitlik: Alkenil hidrojenleri göreceli olarak aisidik



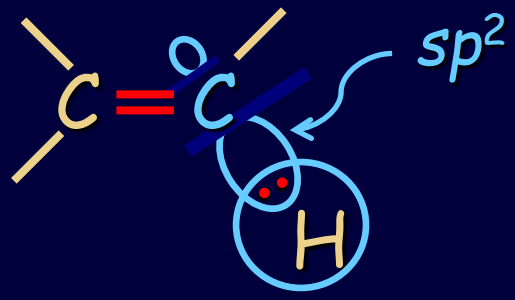
$pK_a \sim 44$ $CH_3CH_3–H \sim 50.$



Problem: Yerseçimliliği ve stereoseseçimlilik.

Öneri: Alkenil halojenürler kullanmak daha uygun.

Alkenil hidrojenleri neden asidik?



33% *s* karakter.

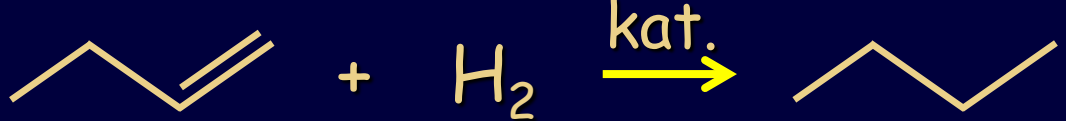
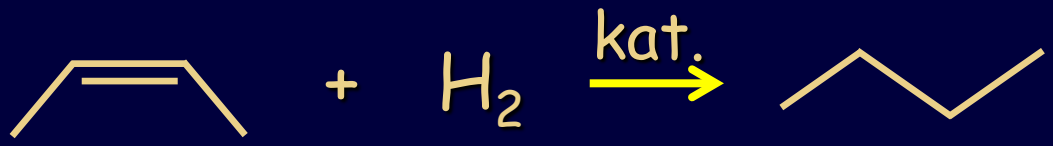
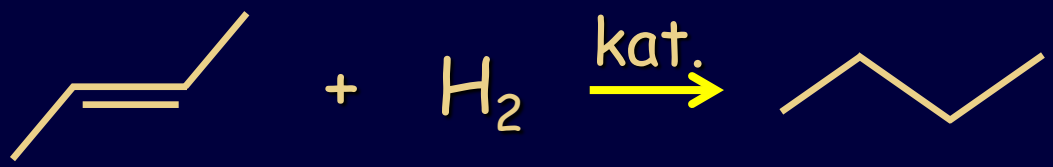
Alkanlarla karşılaştırıldığında:

sp^3 - 25% *s* karakter

Net sonuç: Bağıl olarak e-çekici etki

Alkenlerin Bağıl Kararlığı

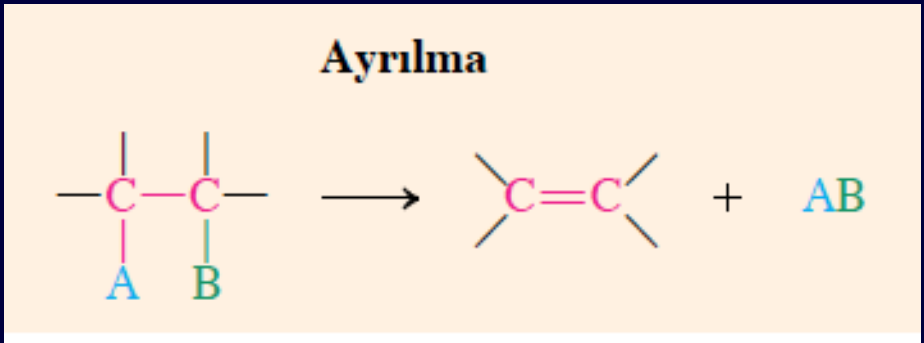
Hidrojenlenme ısısı ΔH_{H2} bütün izomerler için ölçülür örneğin, büten

	ΔH_{H2} (kcal mol^{-1})
	-30.3
	-28.6
	-27.6

Kararlılık: İç alken > Uç alken , trans > cis

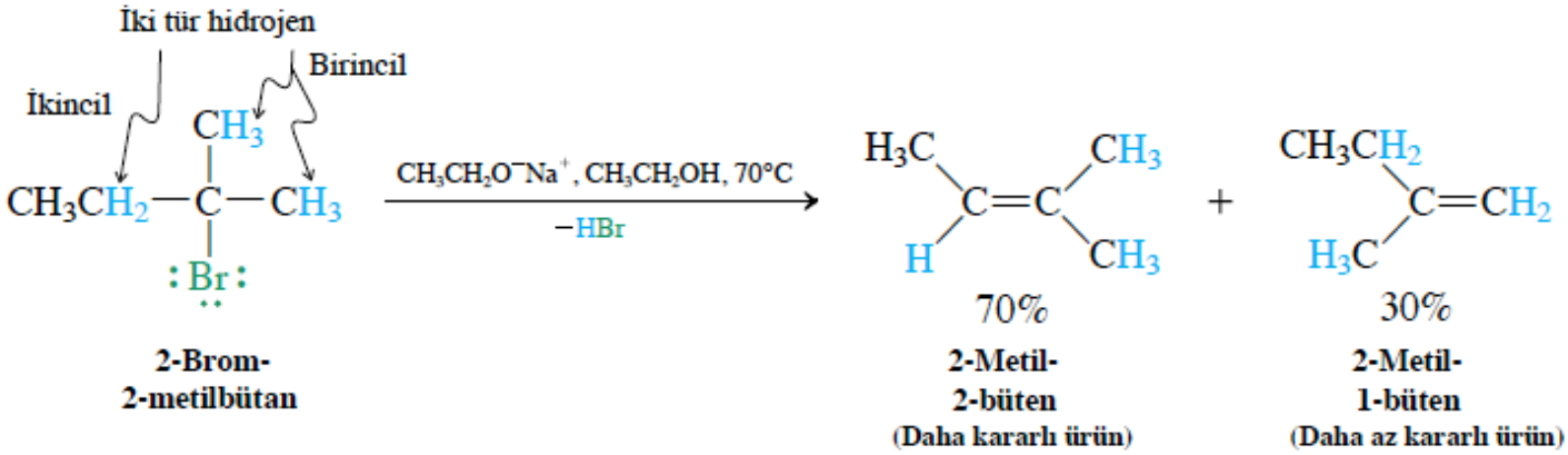
Alkenlerin Sentezi

1. Ayrılma tepkimeleri (E) tekrarı



E_2 tepkimelerinde yerseçimlilik kullanılan baza bağlıdır

2-Brom-2-metilbütanın Etoksit ile E2 Tepkimesi



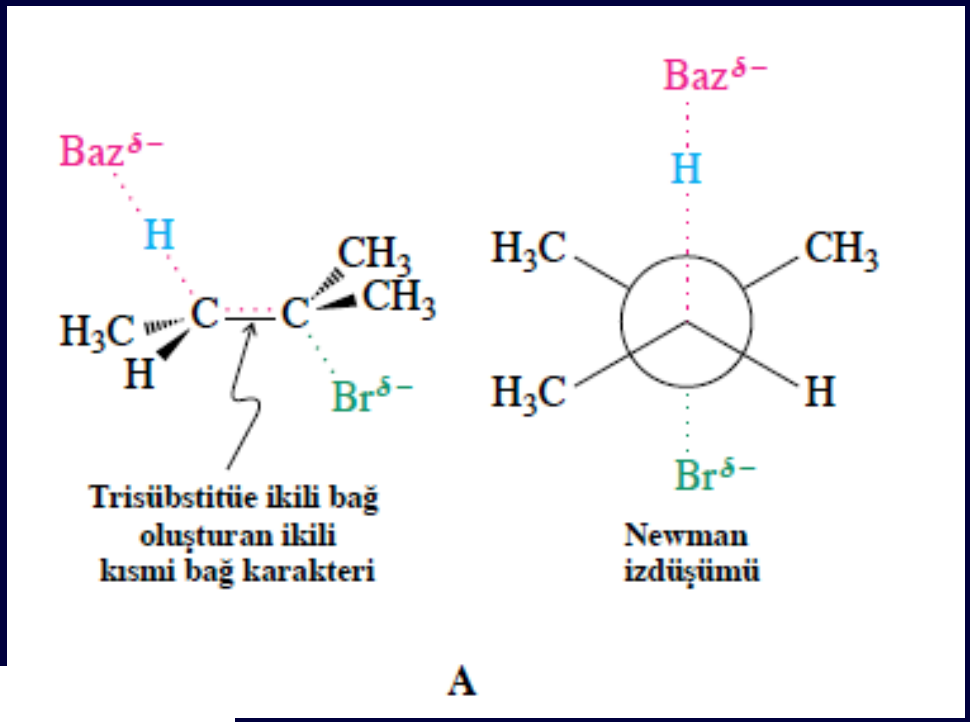
2-Brom-2-metilbütan

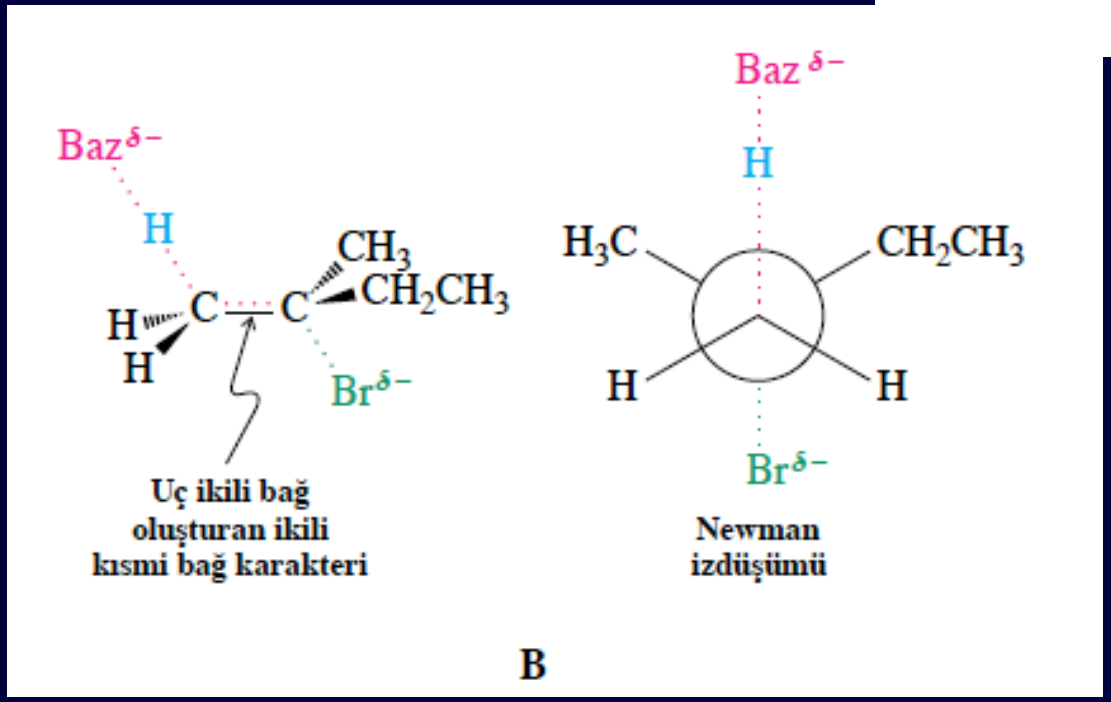
2-Metil-2-büten (Daha kararlı ürün)

2-Metil-1-büten (Daha az kararlı ürün)

Saytzev-Kuralı

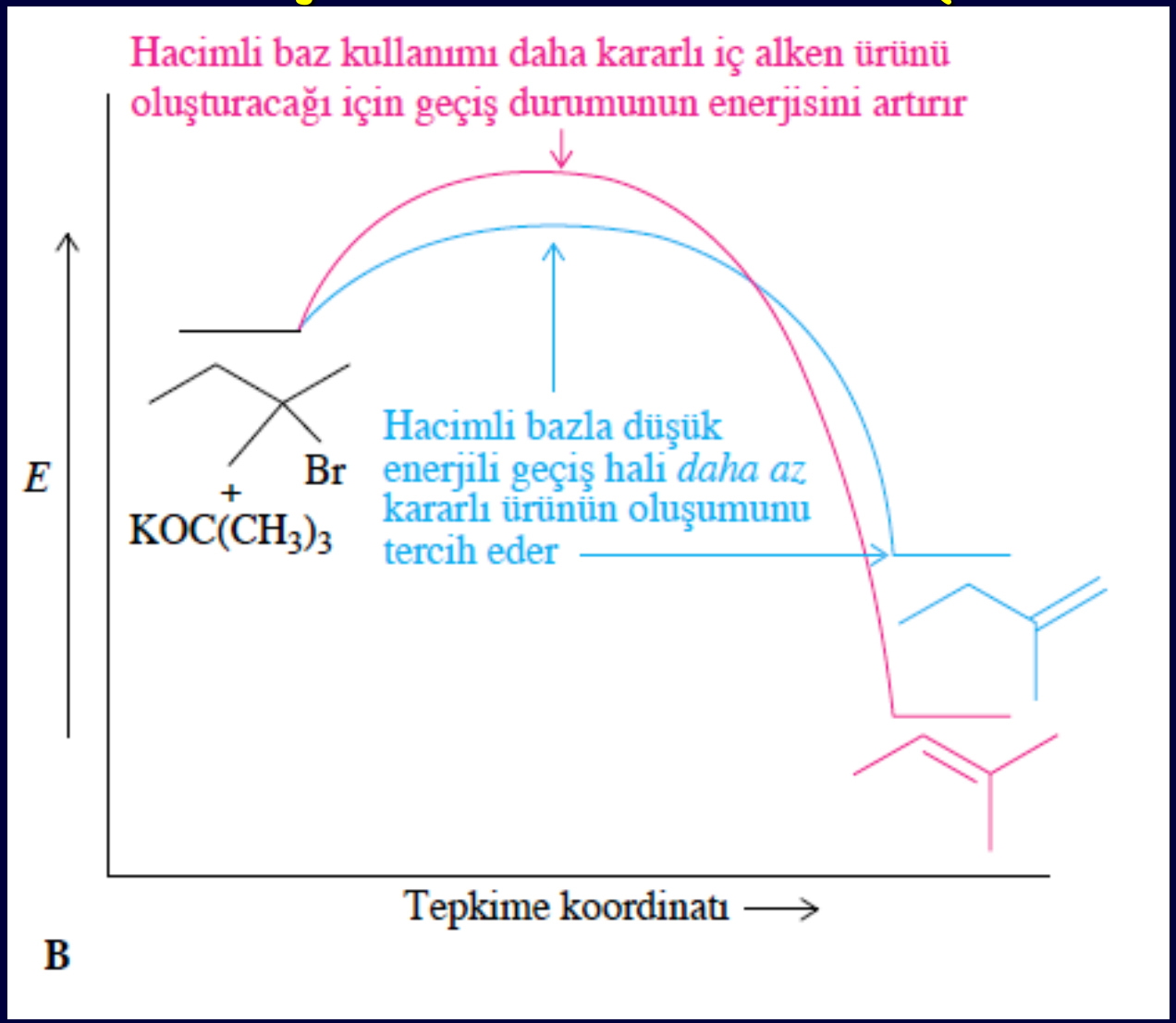
Küçük baz-
Daha kararlı ürün.





Hofmann Kuralı

Büyük baz: Uç alken ana üründür (az kararlı)



2-Brom-2-metilbütanın *ter*-butoksit ile E2 tepkimesi, Hacimli Baz