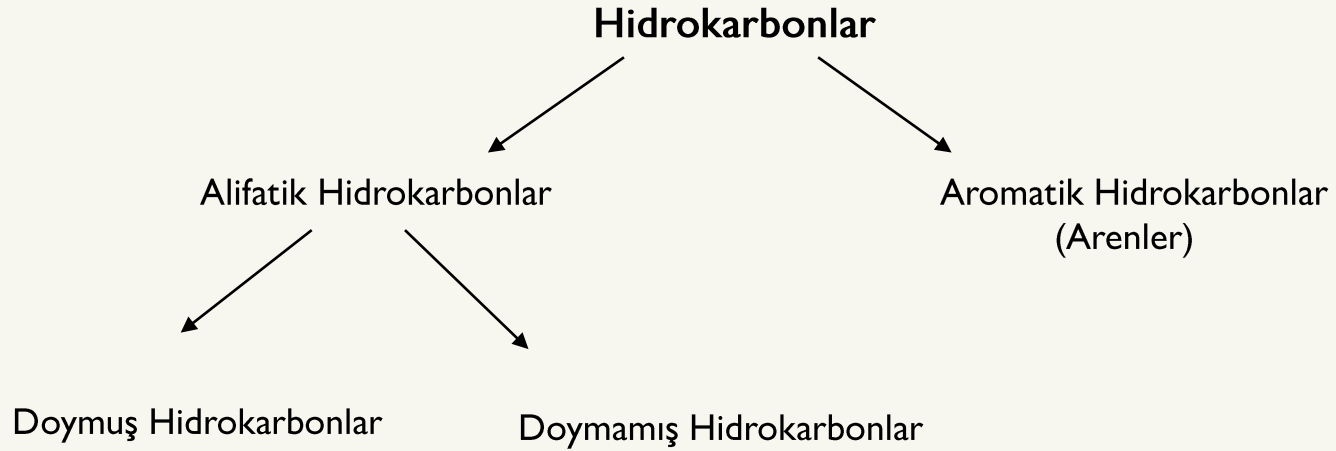


# dersdeo

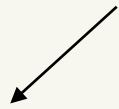
öğrenmenin en kolay yolu o!

## KİMYA

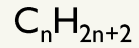
# ORGANİK KİMYA



### Doymuş Hidrokarbonlar



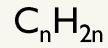
Alkanlar



$$n \geq 1$$



Siklo Alkanlar

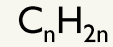


$$n \geq 3$$

### Doymamış Hidrokarbonlar



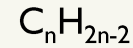
Alkenler



$$n \geq 2$$



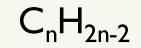
Alkinler



$$n \geq 2$$



Siklo Alkenler

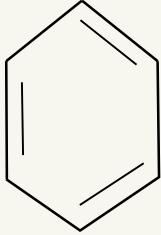


$$n \geq 3$$

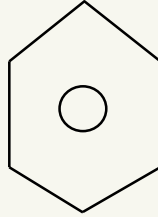
- **Alifatik Hidrokarbonlar**

- Düz zincirli dallanmış ya da halkalı yapıda olabilirler.
- Doymuş ve doymamış olarak sınıflandırılırlar.

— Benzen

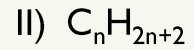
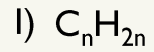


ya da



türevlerini içermezler.

## ÖRNEK



Genel formülüne sahip hidrokarbonlardan hangileri halkalı yapıda olamaz?

## I. Alkanlar

- Parafinler (reaktivitesi az) de denir.
- Düz zincirli ya da dallanmış olabilirler.
- Kaynakları petrol ve doğal gazdır.
- Genel formülleri  $C_nH_{2n+2}$  'dir.

$n=1$   $\text{CH}_4$  metan

$n=2$   $\text{C}_2\text{H}_6$  etan

$n=3$   $\text{C}_3\text{H}_8$  propan

$n=4$   $\text{C}_4\text{H}_{10}$  bütan

$n=5$   $\text{C}_5\text{H}_{12}$  pentan

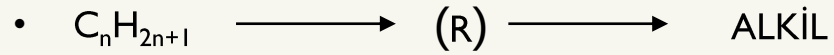
$n=6$   $\text{C}_6\text{H}_{14}$  hekzan

$n=7$   $\text{C}_7\text{H}_{16}$  heptan

$n=8$   $\text{C}_8\text{H}_{18}$  oktan

$n=9$   $\text{C}_9\text{H}_{20}$  nonan

$n=10$   $\text{C}_{10}\text{H}_{22}$  dekan



$CH_3$  metil

$C_2H_5$  etil

$C_3H_7$  propil

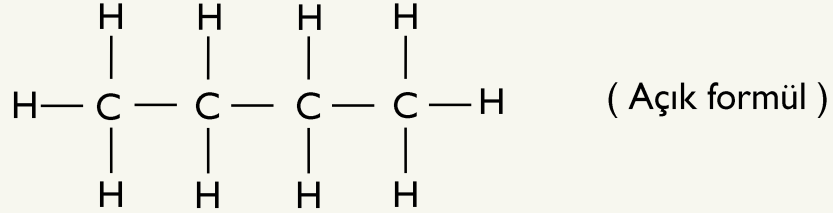
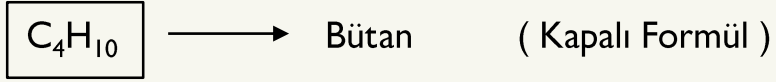
$C_4H_9$  bütül

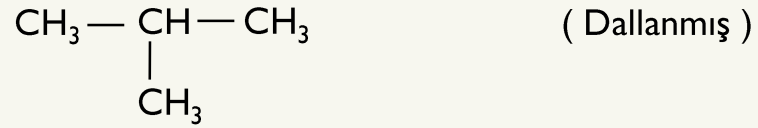
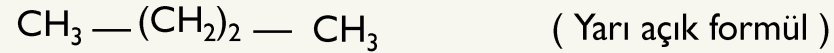
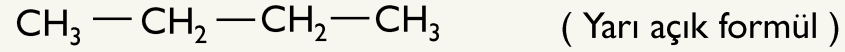
**NOT:** Alkil grupları tek başlarına bulunamazlar. Bileşik değildirler, radikaldirler.

## ÖRNEK:

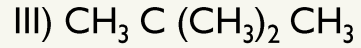
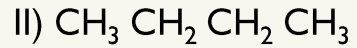
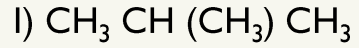
Her bir molekülünde toplam 26 atom bulunduran düz zincirli alkanın kaba formülü nedir?

- Açık Zincirli Alkanlarda Düz Zincirli ve Dallanmış Yapılar



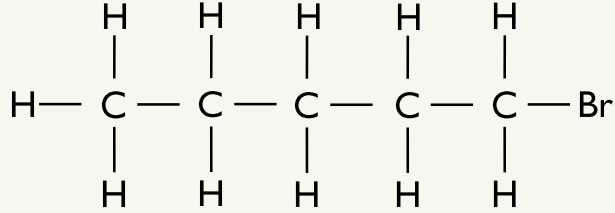


## ÖRNEK



Hangileri dallanmıştır?

## ÖRNEK

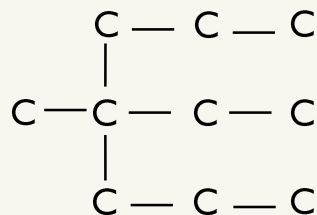


Açık formülü verilen bileşikle ilgili aşağıdaki ifadelerden hangisi yanlıştır ?

- A)Düz zincirli hidrokarbondur.
- B)Kısaltılmış formülü  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{Br}$
- C)Tüm bağları sigmadır.
- D)Tüm C atomları  $\text{sp}^3$  hibritleşmesi yapmıştır.
- E)Yapısındaki alkil grubu n – pentildir.

## Sistemik (IUPAC) adlandırma

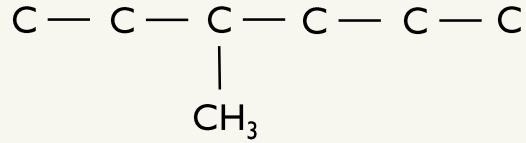
- I) Moleküldeki en uzun karbon zinciri seçilir. Bu zincirdeki karbon sayısına denk gelen alkanın adı temel ad alınır.



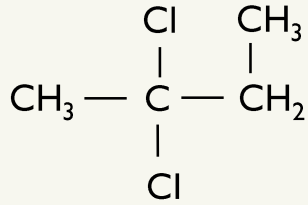
( Bu zincir her zaman düz verilmeyebilir. )

2) Sübstitüentler en küçük numaralı karbon atomuna bağlı olacak şekilde ana zincir üzerindeki karbon atomlarına numara verilir.

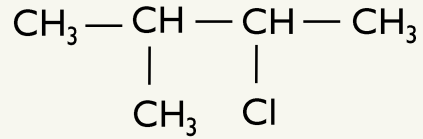
- Ana zincirin dışında kalan atom ya da atom gruplarına **sübstitüent** denir.



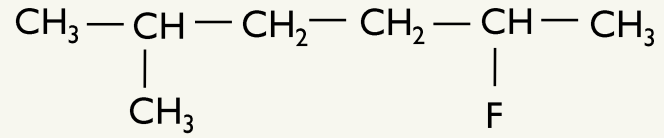
3) Eğer aynı gruplar bir kaç kez tekrarlanmışsa bunlar di, tri, tetra gibi ön eklerle belirtilir.



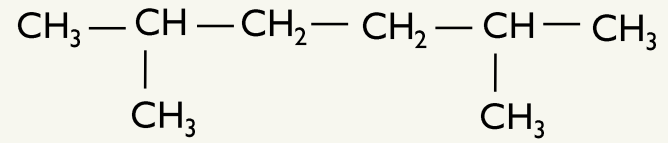
4) Temel zincir sağdan ya da soldan numaralandığında sübstitüentler aynı numaralı C atomunda ise sübstitüentlerin alfabetik sırası önem kazanır.



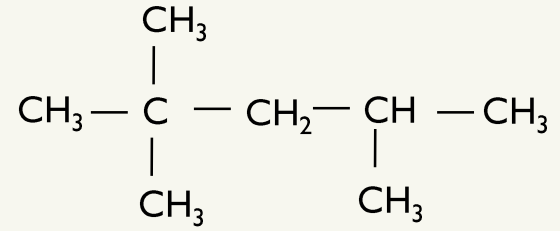
## ÖRNEK



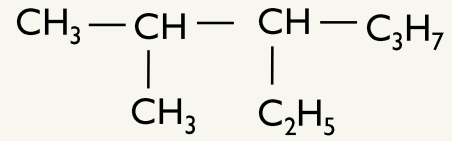
## ÖRNEK



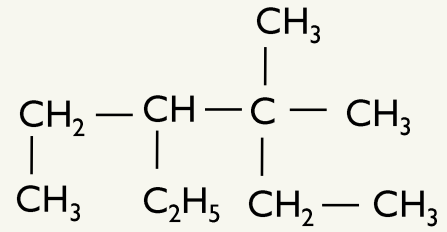
## ÖRNEK



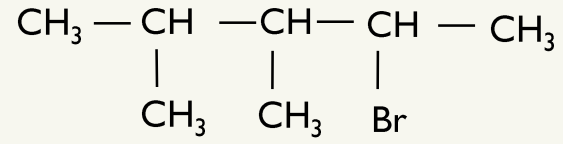
## ÖRNEK



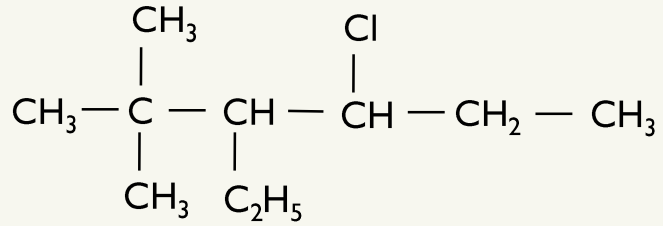
## ÖRNEK



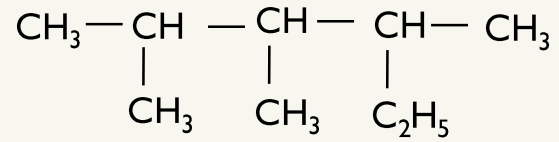
## ÖRNEK



## ÖRNEK



## ÖRNEK



## ÖRNEK

2 , 2 , 3 , 3 – tetra metil bütan bileşiğinin açık formülünü yazınız.

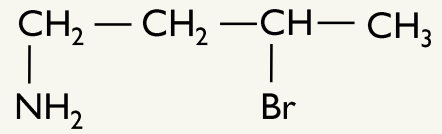
## ÖRNEK

2 – brom 3 – nitro pentan bileşiğinin açık formülünü yazınız.

## ÖRNEK

1, 1, 3, 3 – tetra brom propan bileşığının açık formülünü yazınız.

## ÖRNEK



## ÖRNEK

Mol ağırlığı 100 gram olan düz zincirli alkanın 1 molü kaç mol hidrojen atomu içerir?

( C = 12 H = 1 )

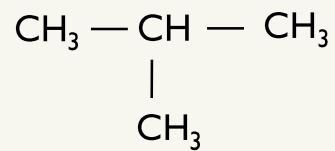
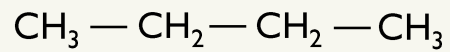
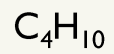
## ÖRNEK

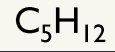
1 , 1 , 2 – tri metil propan bileşiğinin IUPAC sistemine göre adı nedir?

## İzomer Madde

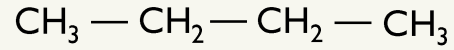
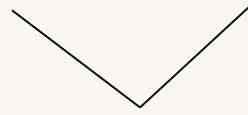
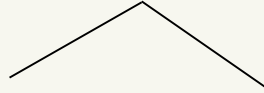
Kapalı formülleri aynı açık formülleri farklı olan maddelerdir.

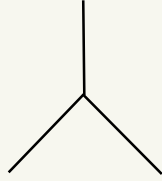
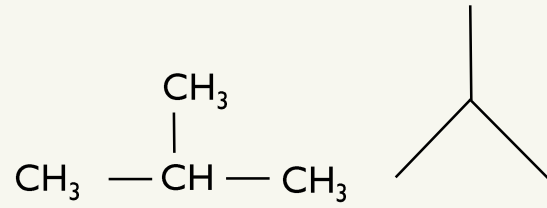
- Alkanlarda izomeri 4.C den itibaren başlar.



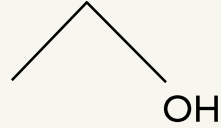
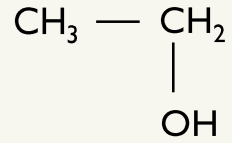


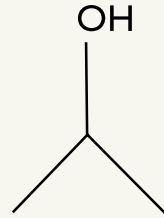
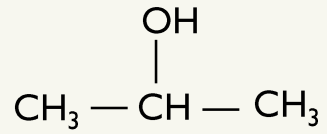
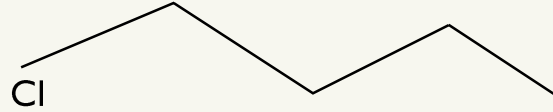
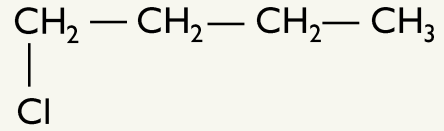
## İskelet (Çizgi – Çubuk) Formülleri

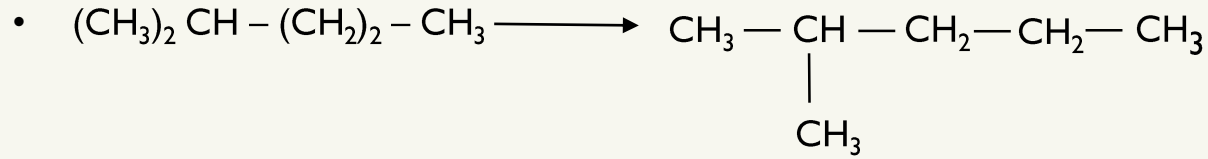




iso bütan







Kısaltılmış yapı formülü

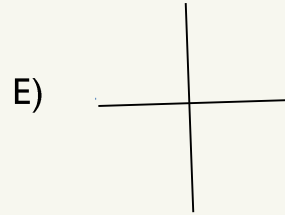
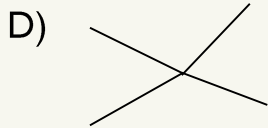
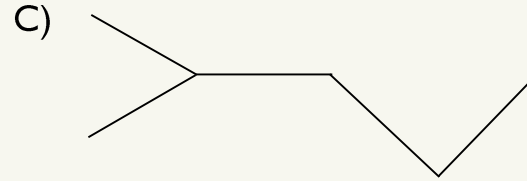
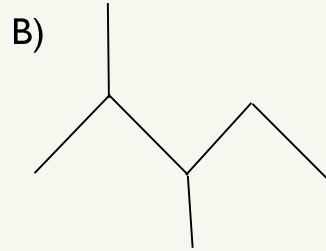
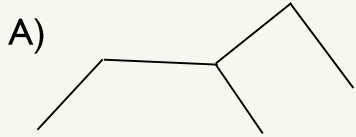
Yapı formülü



(iskelet formülü)

## ÖRNEK

Çizgi formülleri verilen aşağıdaki bileşiklerden hangisi 2, 3 di metil pentandır ?

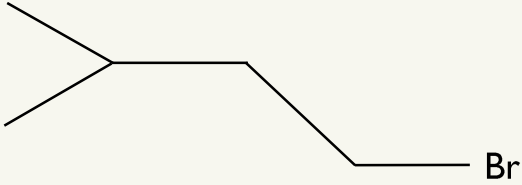


## ÖRNEK

$(\text{CH}_3)_3\text{C}-\text{CH}_2-\text{CH}_3$  kısa yapı formülü verilen bileşiğin çizgi formülü nasıl çizilir?

## ÖRNEK

Çizgi formülü



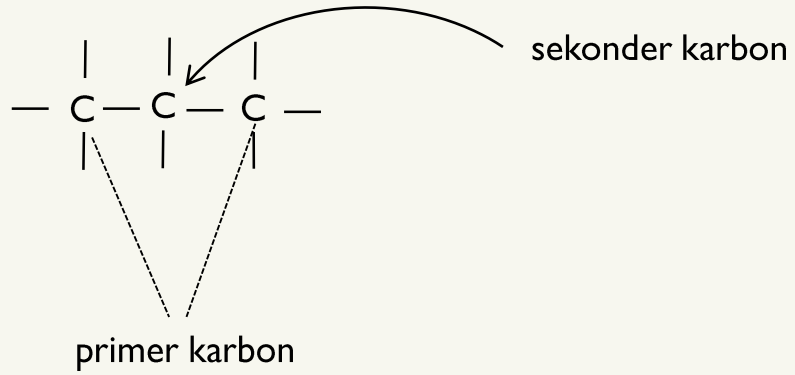
şeklinde olan organik bileşik için,

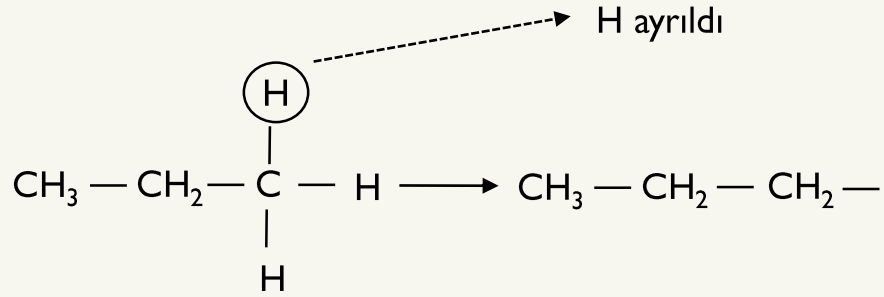
I) izo pentil bromür

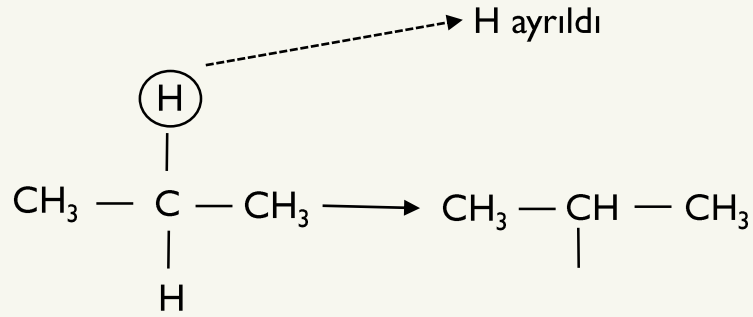
II) I brom 3 metil bütan

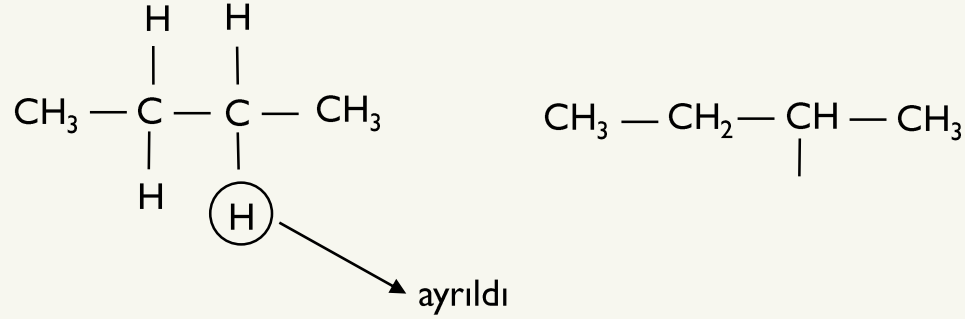
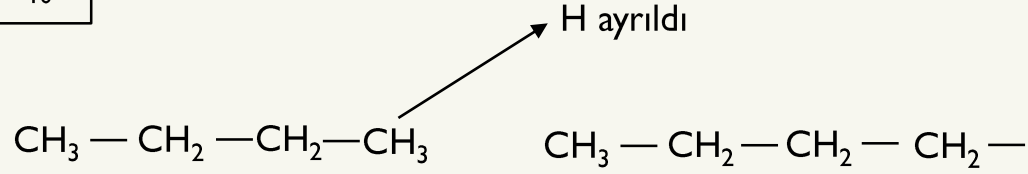
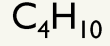
III) neo pentil bromür

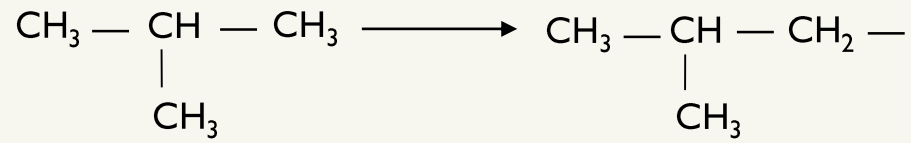
adlarından hangileri kullanılabilir?



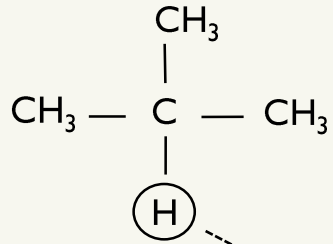




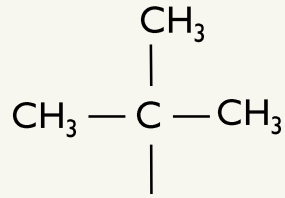




İso bütan



H ayrıldı



## ÖRNEK

4 izopropil oktan bileşiğinin çizgi formülü nasıldır?

# Elektrofil ve Nükleofil

## Elektrofiller ( $e^-$ sevenler )

- Elektrofiller bir  $e^-$  çifti alan moleküller veya iyonlardır. Elektrofiller genellikle  $E^+$  ile gösterilirler.
- Elektrofiller Lewis asit özelliği gösterirler.
- Elektrofiller başka moleküllerden  $e^-$  alma eğilimindedirler.
- Bunlar elektron eksikliği olan nötr maddeler ya da katyonlardır.

$R^+$  ,  $NO_2^+$  ,  $SO_3H^+$  ,  $RCO^+$  ,  $H^+$  gibi iyonlar elektrofil iyonlardır.

## Nükleofiller (çekirdek sevenler)

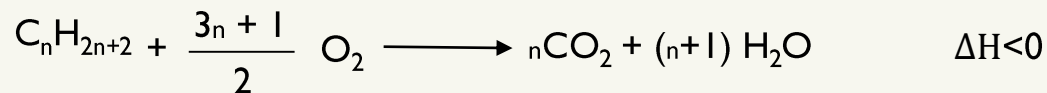
- Nükleofil artı merkez arayan bir reaktiftir.
- $e^-$  çifti veren , çekirdek seven anlamına gelen taneciklerdir.
- Nükleofiller Lewis bazı özelliği gösterirler.
- Nükleofiller genellikle  $Nu :^-$  ile gösterirler.
- Nükleofiller başka moleküllere  $e^-$  verme eğilimindedirler.
- Nükleofiller iyon ya da molekül halinde bulunabilirler.
- $H_2O$ ,  $NH_3$ ,  $OH^-$ ,  $F^-$ ,  $Cl^-$ ,  $Br^-$  , ....

## Süstitüsyon Tepkimeleri :

Bir organik bileşikte bulunan atom ya da grubun yerine başka bir atom ya da grubun geçmesi olayına süstitüsyon (yer değıştirme) denir.

## Alkanların Reaksiyonları

I) Yanarlar.

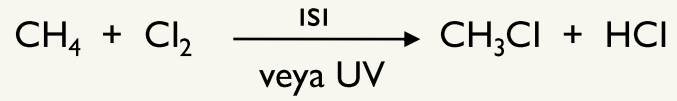


- Organik maddelerin yanmaları yükseltgenmedir.
- Önemli miktarda ısı açığa çıktığından yakıt olarak kullanılırlar.
- $\text{CCl}_4$ ,  $\text{CF}_4$ ,  $\text{CO}_2$  gibi karbon bileşikleriy yanmazlar; çünkü bu bileşiklerde C yeterince yükseltgenmiştir.

## 2) Yer deęiřtirme ( Sbstitsyon )

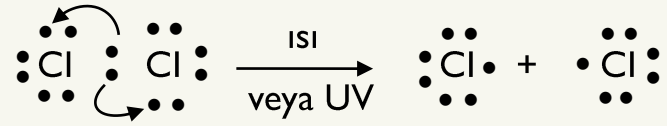
Alkanlar gneř ıřıęında (UV) veya yksek sıcaklıklarda halojenlerle radikalik sbstitsyon reaksiyonu verir. Bu reaksiyonda bir halojen atomu alkanın bir hidrojeni ile yer deęiřtirir.

Örneğin,

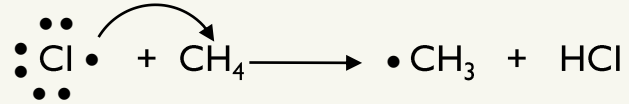


Tepkime mekanizması,

1. Basamak

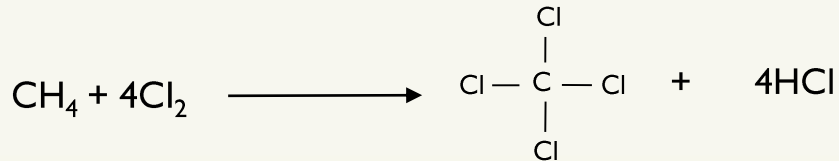
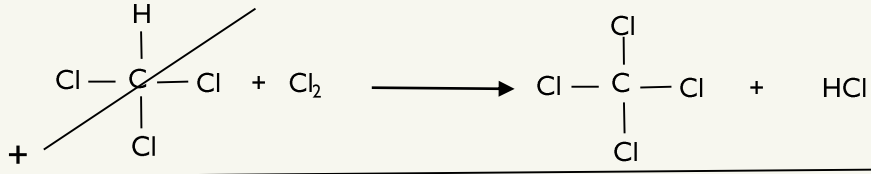
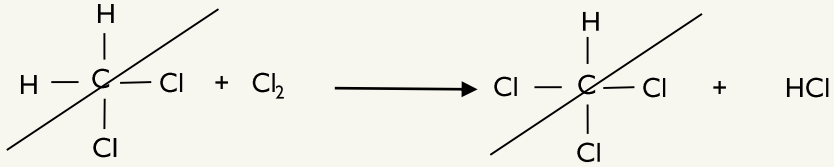
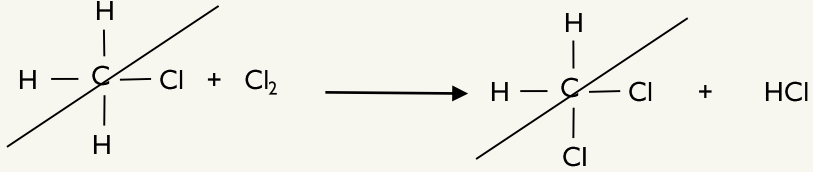
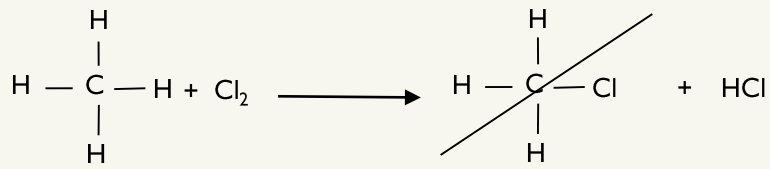


2. Basamak



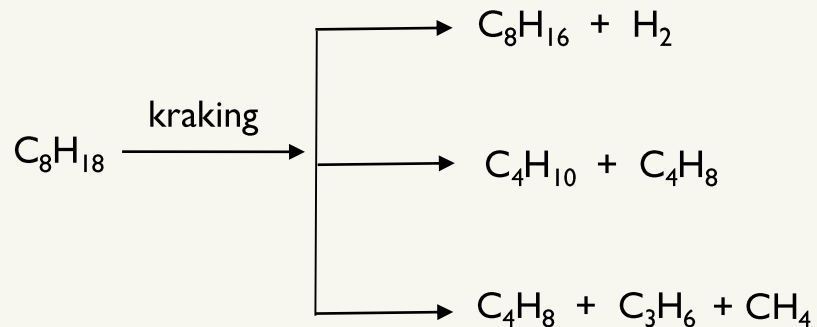
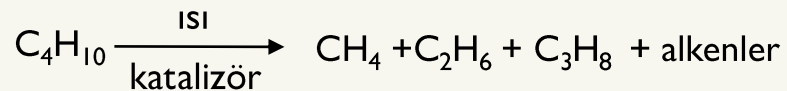
3. Basamak





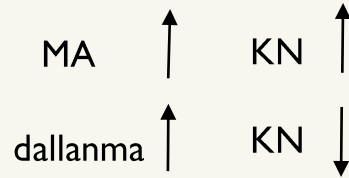
### 3) Kraking ( parçalanma ) Tepkimeleri

Çok karbonlu alkanlar katalizörlü ortamda ve yüksek sıcaklıkta parçalanarak daha küçük alkanlar elde edilir. Bu olaya **katalitik kraking işlemi** denir. Kraking işlemleri petrolün işlenmesinde kullanılır.



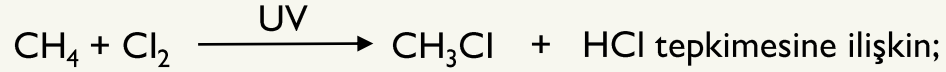
## Alkanların Genel Özellikleri

- 1) Alkanların ilk 4 üyesi gaz , 5-17 karbon içerenler sıvı , diğerleri ise katıdır.
- 2) Alkanlar apolar maddelerdir .Bu nedenle suda çözünmezler. Benzen ve  $\text{CCl}_4$  gibi çözücülerde çözünürler.
- 3) Moleküller arası temel kuvvetler London kuvvetleridir.



- 4) Renksiz, kokusuz ve tatsızdırlar.
- 5) Homolog sıra oluştururlar.
- 6) Yanarlar.
- 7) Katılma tepkimesi vermezler. Ancak halojenlerle radikalik süstitüsyon reaksiyonu verirler.

## ÖRNEK



I) Radikalik süstitüsyon tepkimesidir.

II) Bir basamağında  $\cdot\ddot{\text{Cl}}\cdot$  radikali oluşur.

III) Diğer basamağında  $\cdot\text{CH}_3$  radikali  $\text{Cl}_2$  ile etkileşir.

hangileri doğrudur ?

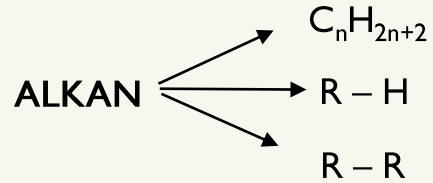
## ÖRNEK

Açık zincirli alkanlarla ilgili aşağıdaki ifadelerden hangisi yanlıştır?

- A) Genel formülleri  $C_nH_{2n+2}$  dir.
- B) Zincir izomerisi 4 karbonlu alkandan başlar.
- C) UV'de halojenlerle yer değiştirme tepkimesi verirler.
- D) Homolog sıra oluştururlar.
- E) Küçük molekülü üyeleri suda iyi çözünür.

## Alkanların Eldesi

I) Würtz Sentezi  $\longrightarrow$  ( organik redoks tepkimesi )



**NOT:** Würtz senteziyle  $CH_4$  elde edilemez.

$R-X$  ( Alkil halojenür )



## ÖRNEK

Metil bromür kullanarak würtz senteziyle hangi alkan elde edilir?

## ÖRNEK

Metil klorür ve etil klorür kullanarak würtz senteziyle hangi alkanlar elde edilir?

## ÖRNEK

İzo propil klorür kullanarak würtz senteziyle hangi alkan elde edilir?

## ÖRNEK

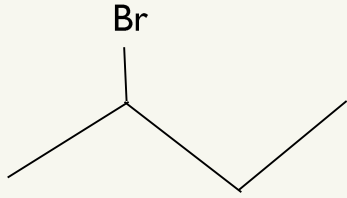
İzo propil klorür ve n propil klorür kullanarak würtz senteziyle hangi alkanlar elde edilir?



## ÖRNEK

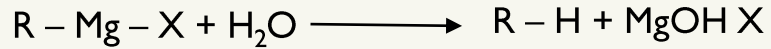
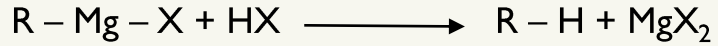
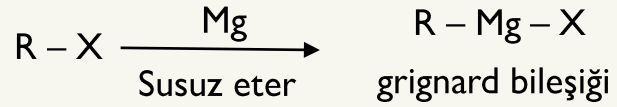
Würtz senteziyle 2 metil bütan bileşiği elde edilmiştir. Buna göre kullanılan alkil halojenürler neler olabilir?

## ÖRNEK

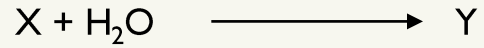
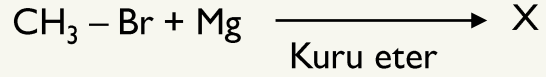


kullanarak würtz senteziyle hangi alkan elde edilir?

## 2) Grignard sentezi

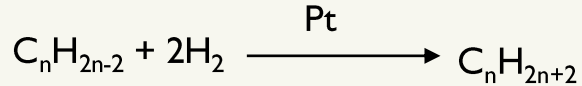
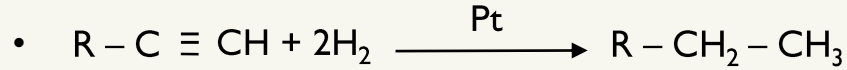
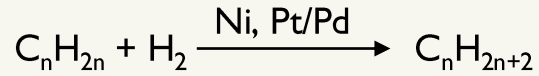
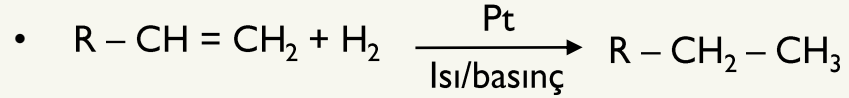


## ÖRNEK

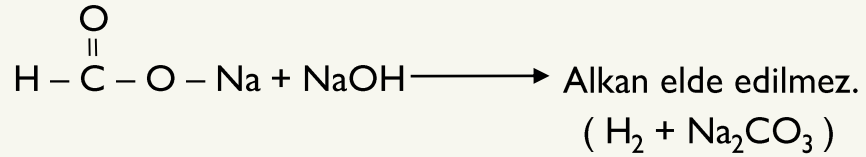
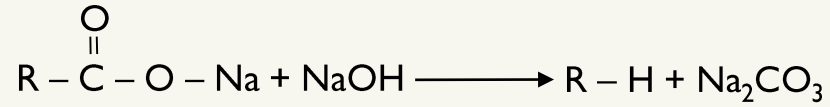


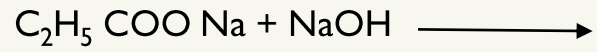
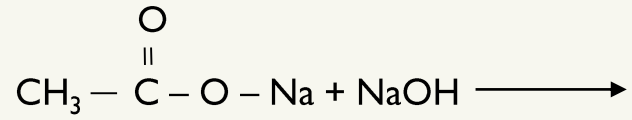
X ve Y maddeleri nelerdir?

### 3) Doymamış Hidrokarbonların İndirgenmesi



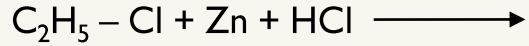
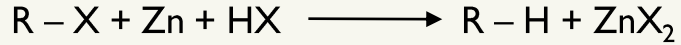
#### 4) Karboksilli Asit Tuzlarının Dekarboksilasyonu



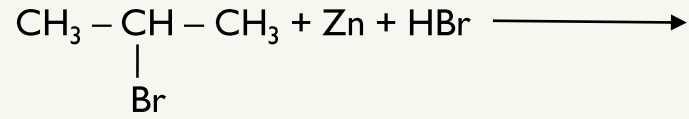


## 5) Alkil Halojenürlerin İndirgenmesiyle

Alkil halojenürler  $\text{Zn}/\text{HCl}$  ya da  $\text{LiAlH}_4$  ortamında indirgendiğinde alkanlar elde edilir.

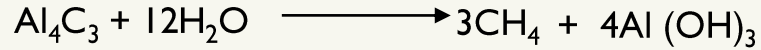


## ÖRNEK

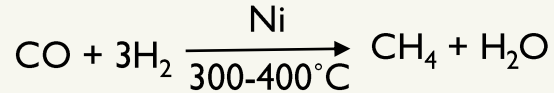
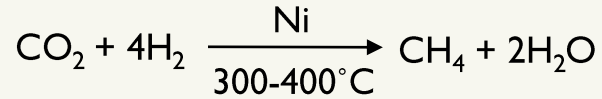


## Metan Gazının Özel Eldesi

1)  $\text{Al}_4\text{C}_3$  ün seyreltik asitli ortamda  $\text{H}_2\text{O}$  ile tepkimesinden

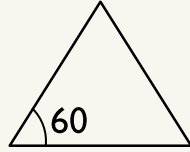
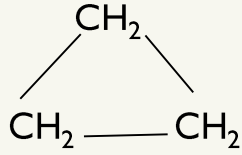


2)  $\text{CO}_2$  veya  $\text{CO}$  gazlarının hidrojenlenmesinden

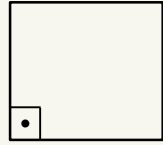
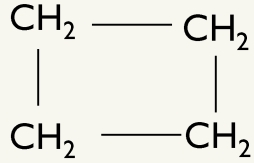


## Siklo Alkanlar

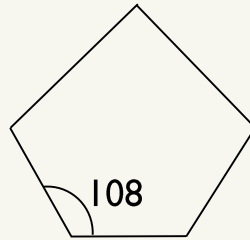
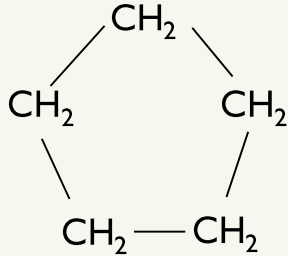
Halkalı yapıdaki doymuş hidrokarbonlardır. Tek halkalılar için genel formülleri  $C_nH_{2n}$  dir. En basit üyeleri 3 karbonludur.



Siklo propan



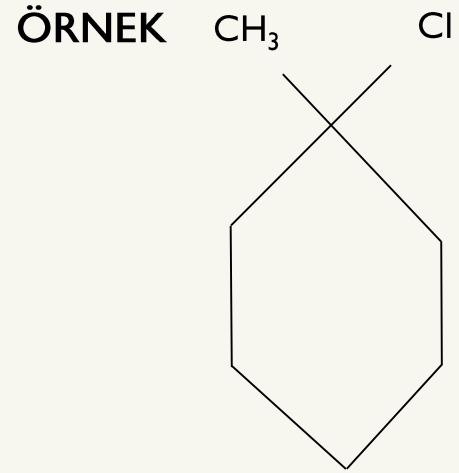
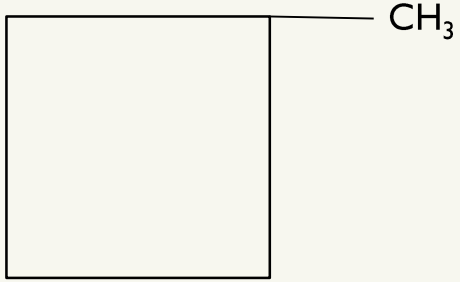
Siklo bütan



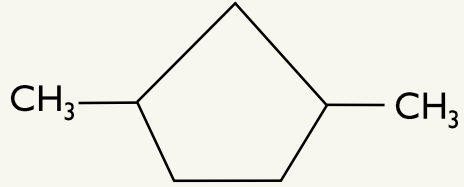
Siklo pentan

## Adlandırma

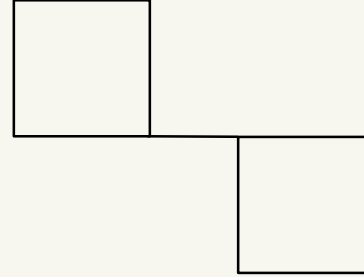
### ÖRNEK



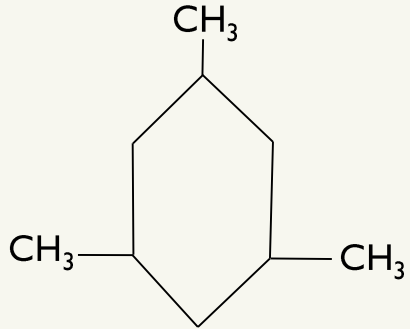
ÖRNEK



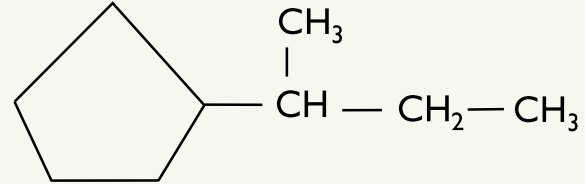
ÖRNEK



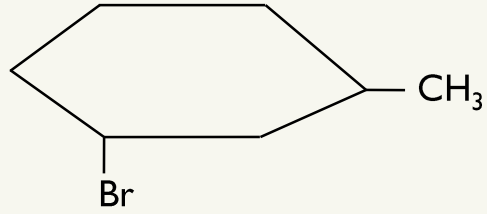
ÖRNEK



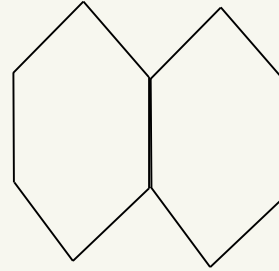
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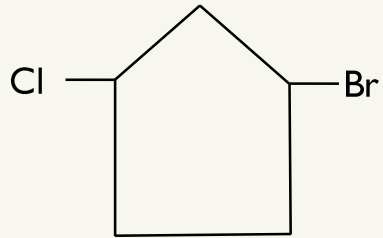
ÖRNEK



ÖRNEK



ÖRNEK



## Fiziksel ve Kimyasal Özellikleri

- Aynı karbon sayılı mono alkenlerle izomerdirler.
- KN ve yoğunlukları alkanlara yakındır. (Alkanlardan fazladır.)
- Kimyasal özellikleri siklo propan ve siklo bütan dışında alkanlara benzer.

siklo propan KN = - 33C°

Propan KN = -42,2 C°