

Mühendislik Fakültesi



Kimya Mühendisliği Bölümü

KMB322-Polimer Kimyası ve Teknolojisi

Dr. Öğr. Üyesi, İsa DEĞİRMENCI

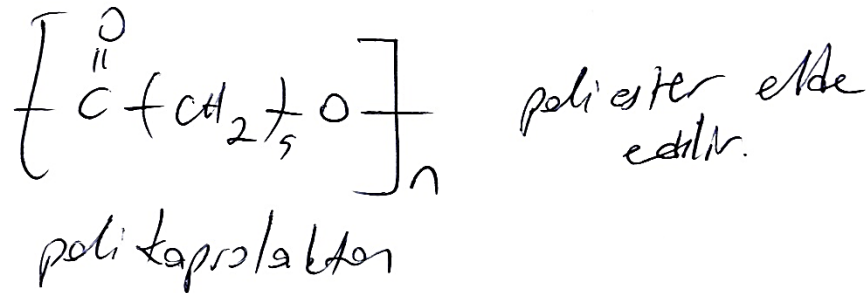
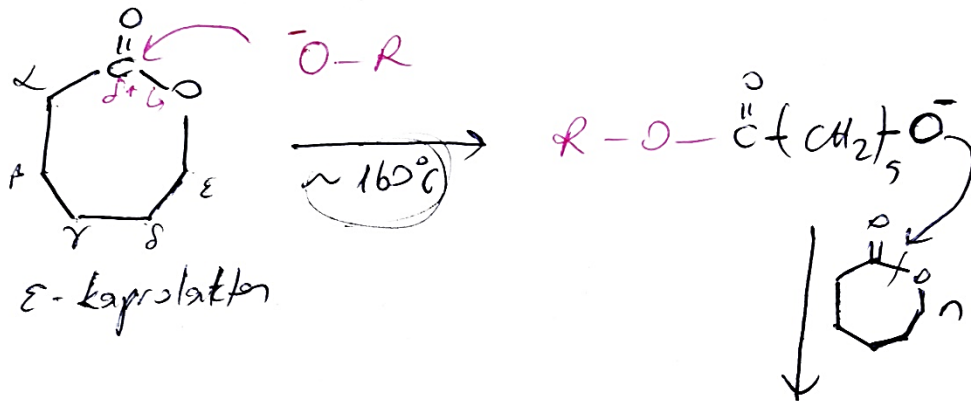
Halka Açılımı Polimerizasyonu

KMB322-Polimer Kimyası ve Teknolojisi

Hafta-13



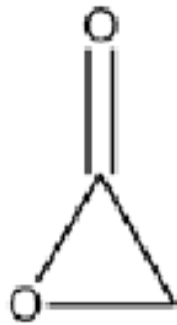
poli ε-kaprolakton



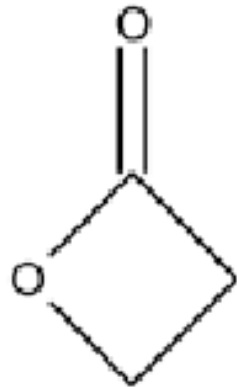
Başlıca olarak daha etkili olan Alkyl litij-
veya alkil magnez gibi organometalik bileşikler
tarafından yapılır.

İlac sistemi sistemleri için geliştirilmiş polimerlerdir.

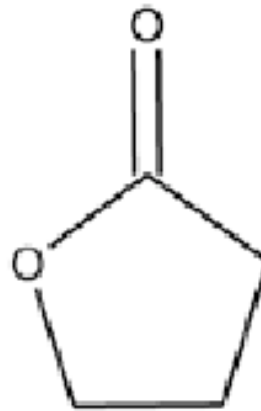




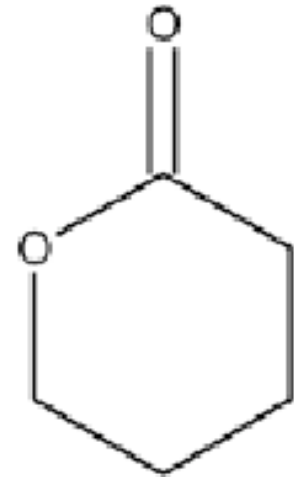
α -lactone



β -lactone

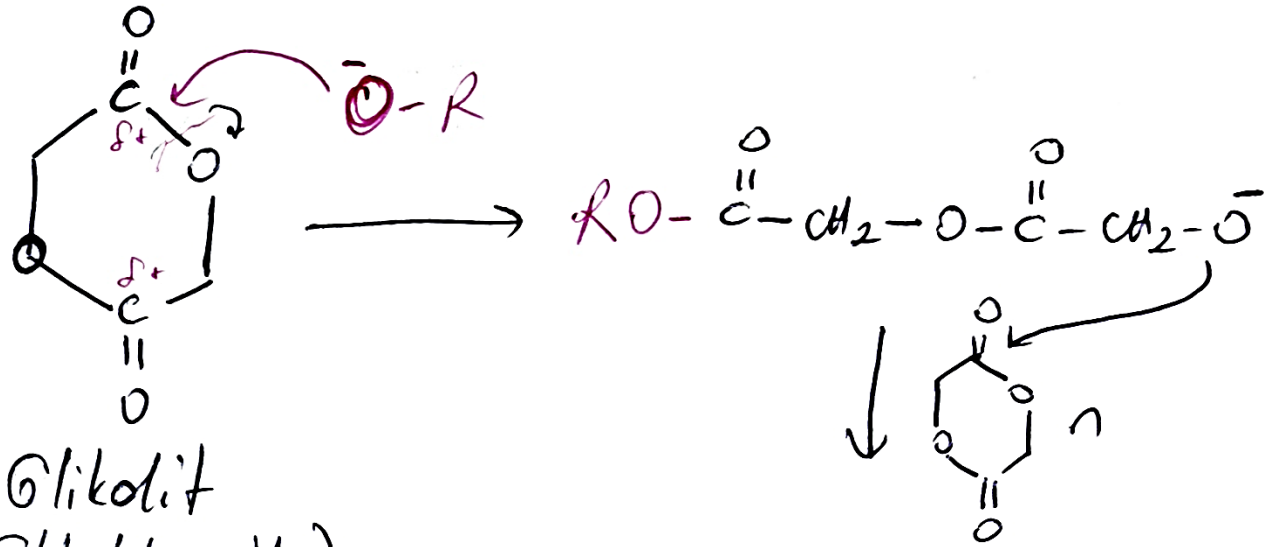


γ -lactone

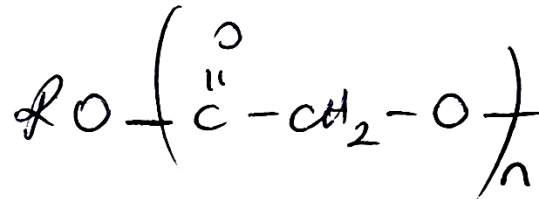


δ -lactone

Poli glidit veya Poliglolik asit (PGA)

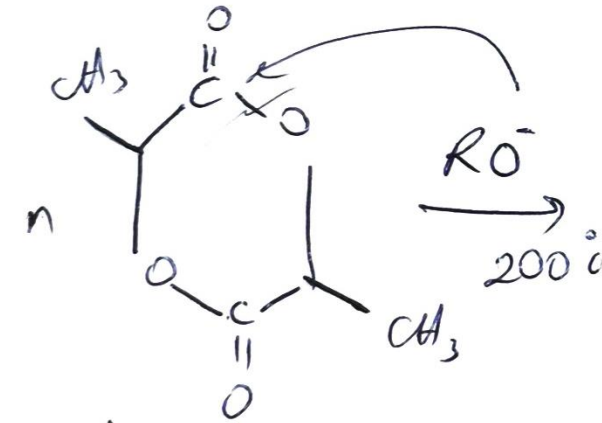


Glikolit
(Glikolit asitleri)
elde edilen
dimer

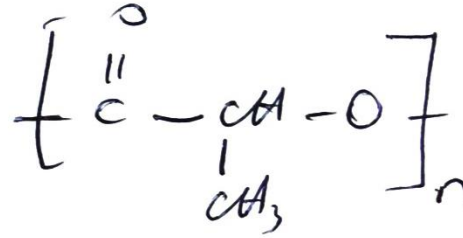


poliglidit

Poli laktik asit (PLA)



Laktit
(Laktik asit dimeri)



polilaktit
(polilaktik asit)
PLA

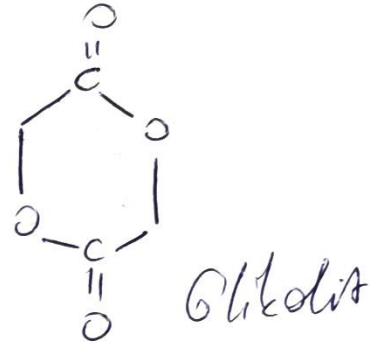
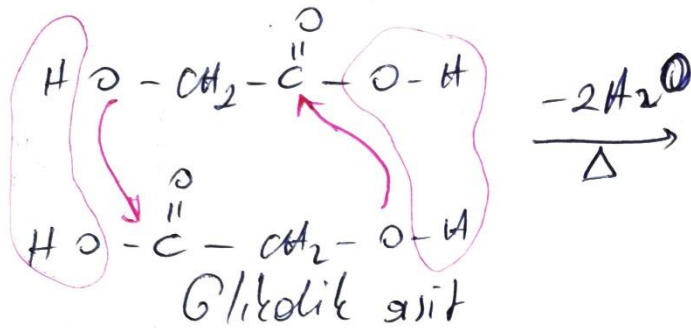
PLA

$T_g = 60-65^\circ C$
 $T_m = 173-178^\circ C$

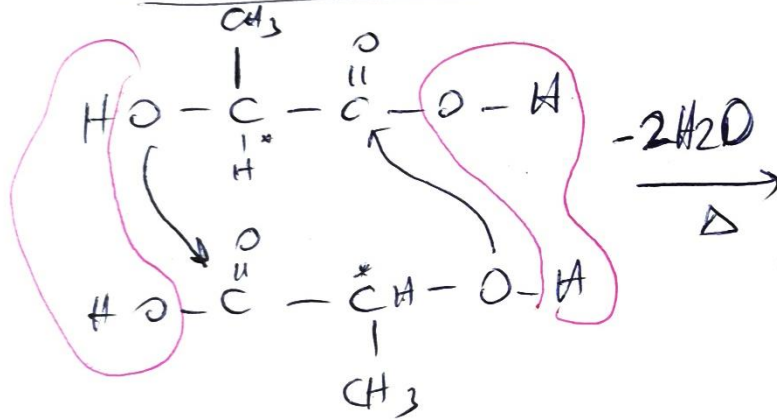
PGA ve PLA eneliyet ipi yppimn de kullandir.



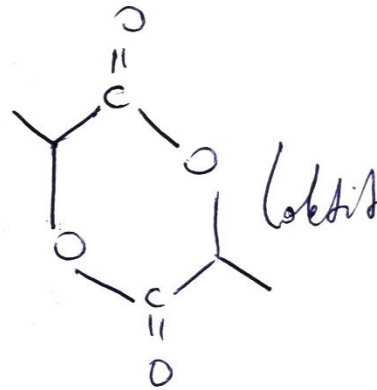
Glikolit eldeşi



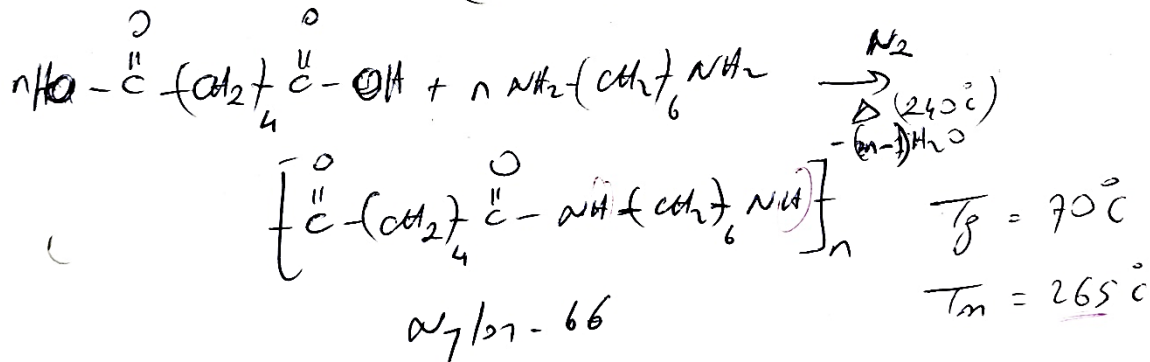
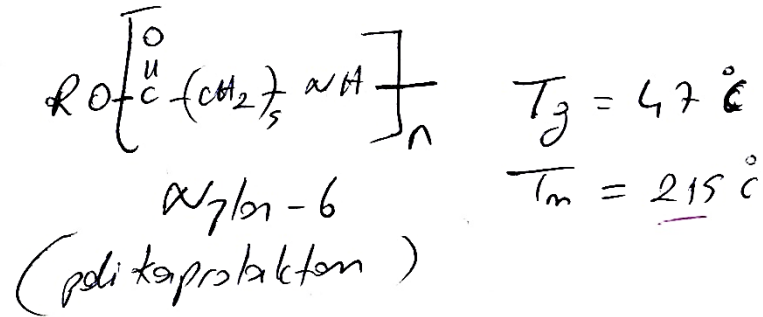
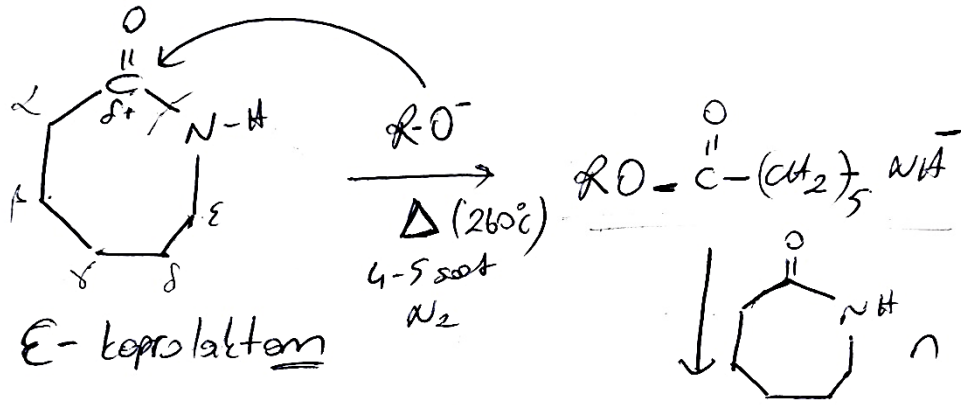
Laktit sentezi

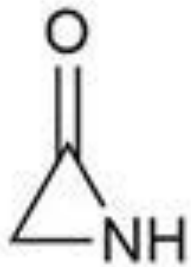


Laktik asit

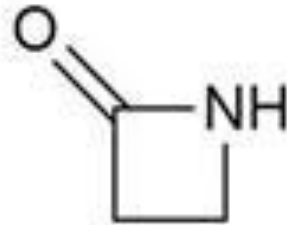


Nylon-6 (Polikapronit) Sentesi

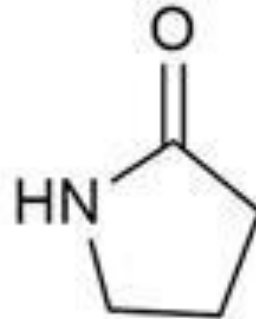




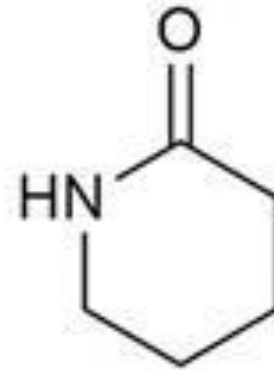
α -lactam



β -lactam

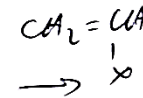
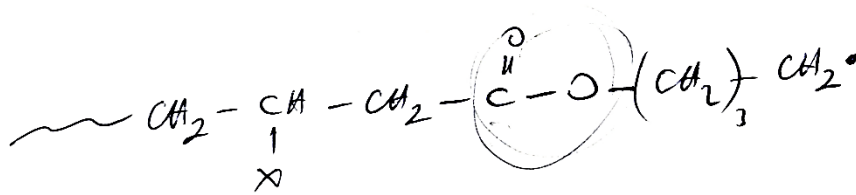
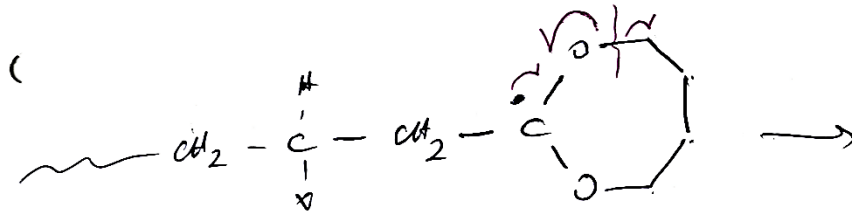
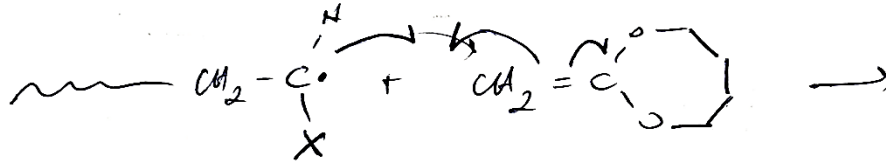
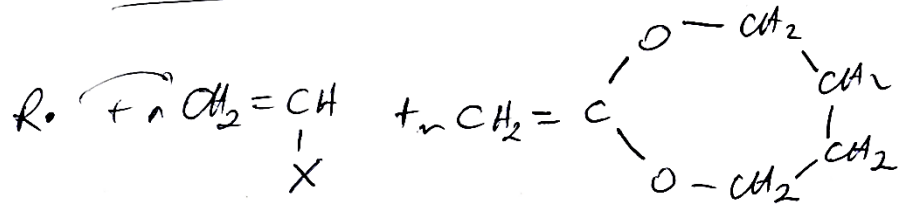


γ -lactam



δ -lactam

Vinil (Asetat linki kiseren) monomeri

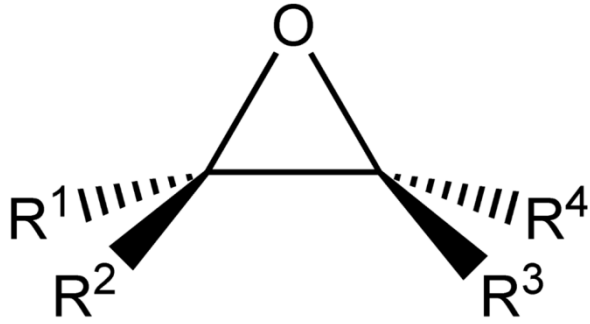


poli vinil X or serin de de ester bej?
icak.





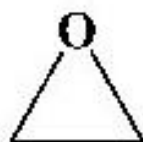
Epoksi Reçineler



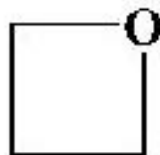
Epoksi reçineler için
Reaktif epoksit grubu.



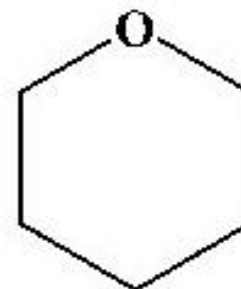
Epoksi yapıştırıcısı
Epoksi reçine ve
sertleştirici yanyana



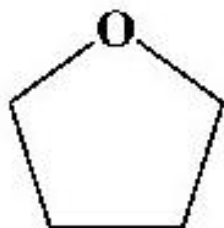
Oxacyclopropane
(oxirane, ethylene oxide)



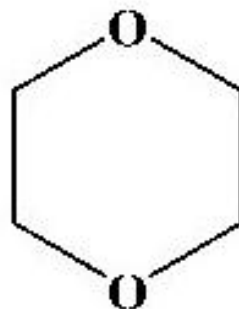
Oxacyclobutane
(oxetane)



Oxacyclohexane
(tetrahydropyran)

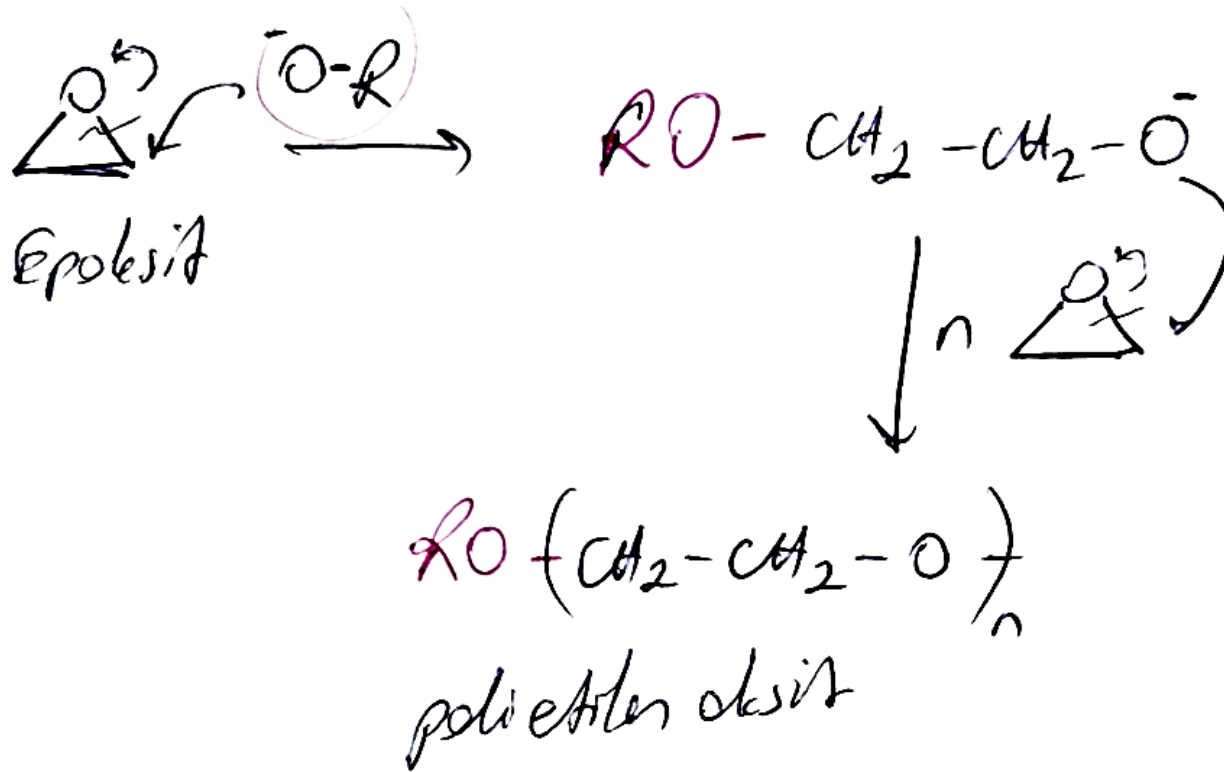


Oxacyclopentane
(tetrahydrofuran)

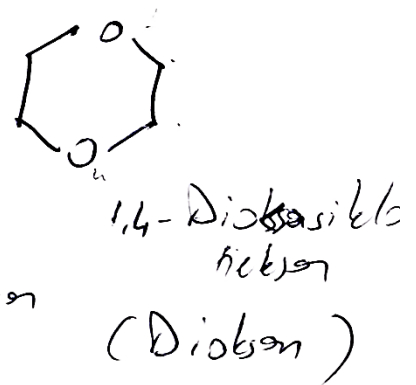
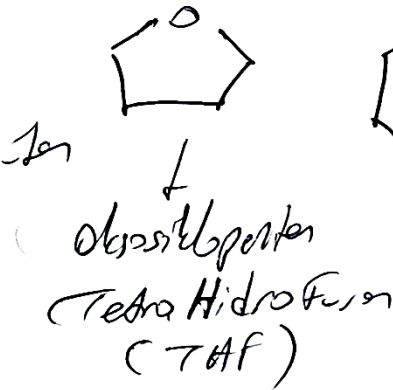
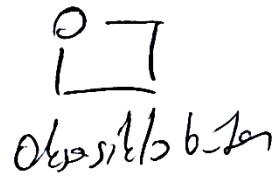
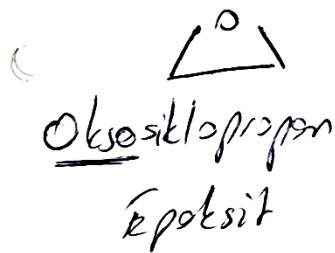
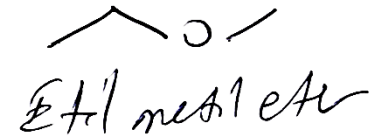
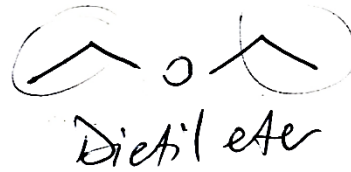
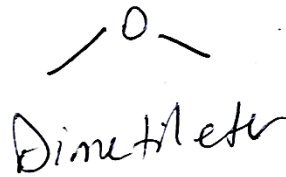


1,4-Dioxacyclohexane
(1,4-dioxane)

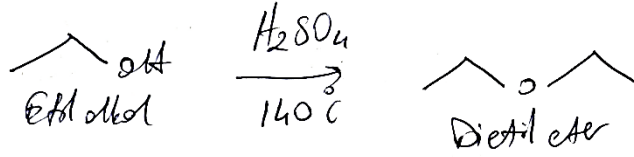
Poli Epoksitler



Eterler ($R-O-R'$)

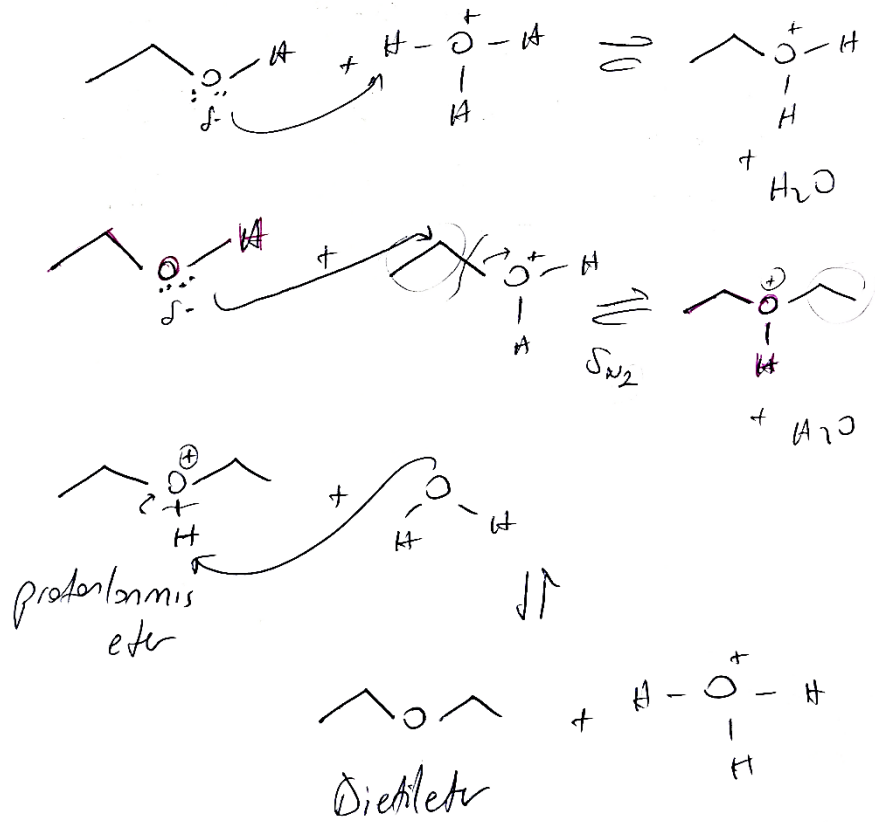


Eter sentezi



Eter stabil 180°C civarında alkolat olarak oluşur.
Eter (C₂H₅)₂O oluşur.

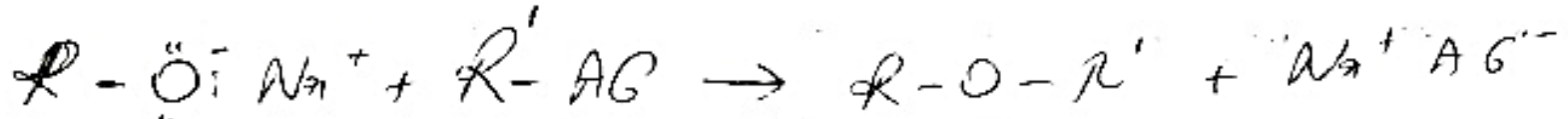
Mekanizma



Williamson Eter Sentezi

(2)

Nükleofilite gerektiren tepkime, sınırlı olarak etanol sentezinde kullanılır.



İsodiyum veya Potasyum alkolat

alkil \rightarrow halojenür \rightarrow Sülfonat \rightarrow dialkil sülfat

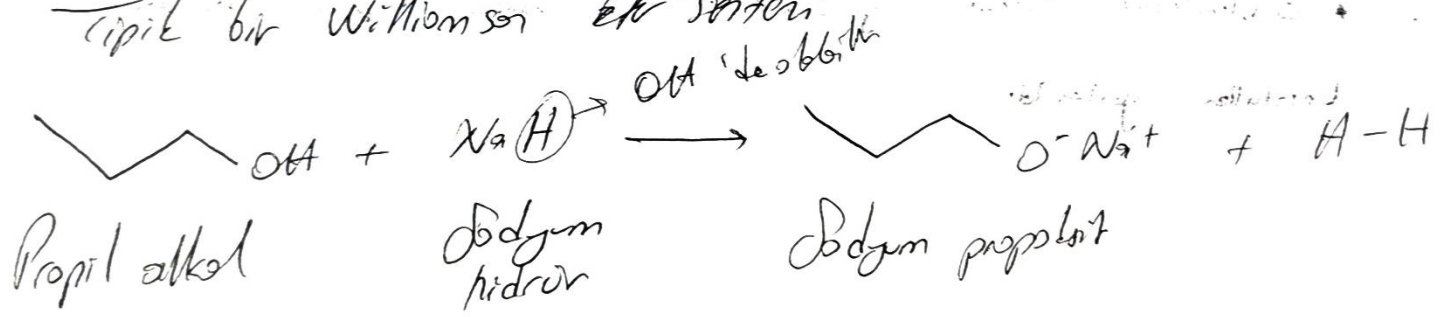
Eter

AG: Ayrılabilir grup $-Br, -I, -OSO_2R''$

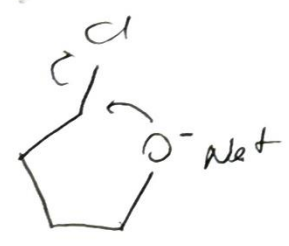
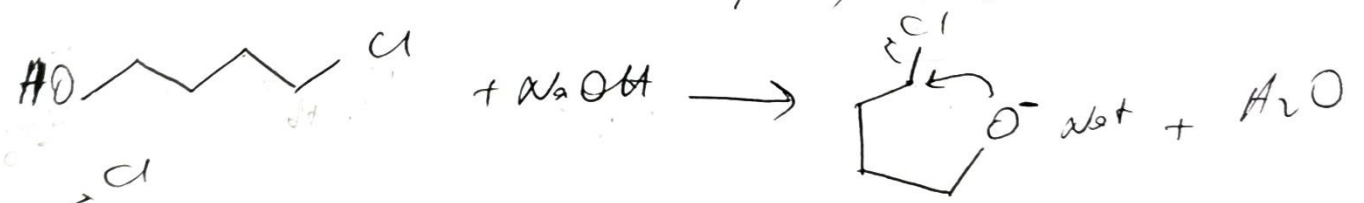
Substrat iyi bir Ayrılabilir Gruba sahip olmalı ve hacimli olmamalı (hacimli olması elektrofili tepkimeye sebep olabilir).



Tipik bir Williamson etil sentezi



THF (tetrahidro furan, oksipolan parçası) in sentezi



Organik tepkimelerde çözücü kullanılır çünkü bir çözücü.



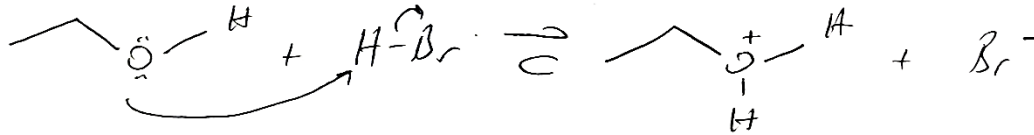
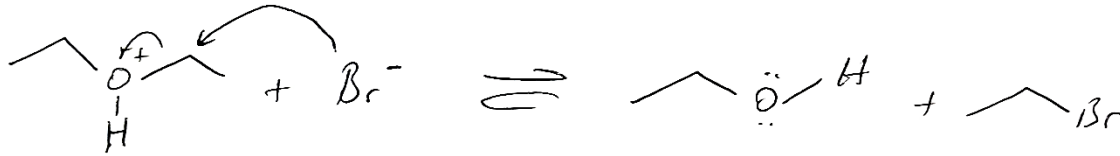
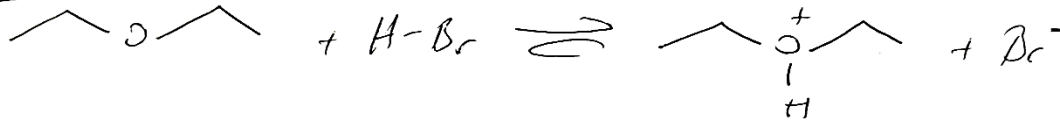
Eterlerin Yotlanması

(3)

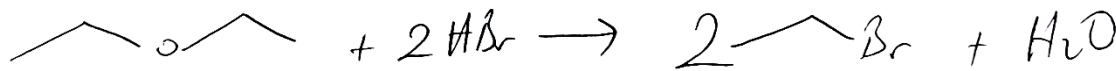
Dialkil eterler, asitler dışında çok az reaktif ile tepkimeye girerler.

Eterler nükleofilik saldırılara ve bu türden tersi dengesizliklere (Epolleritler hariç).

Mekolizasyon



Epollerit

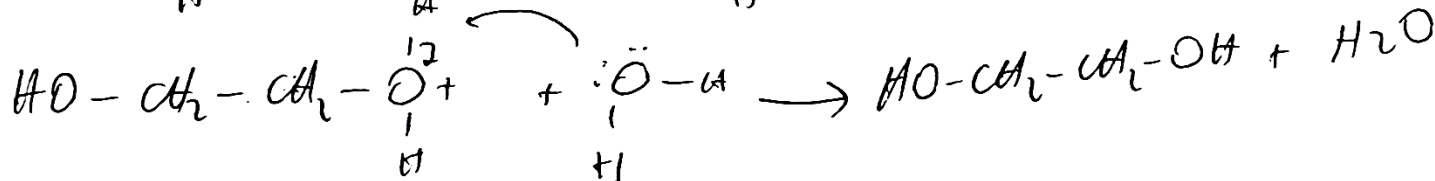
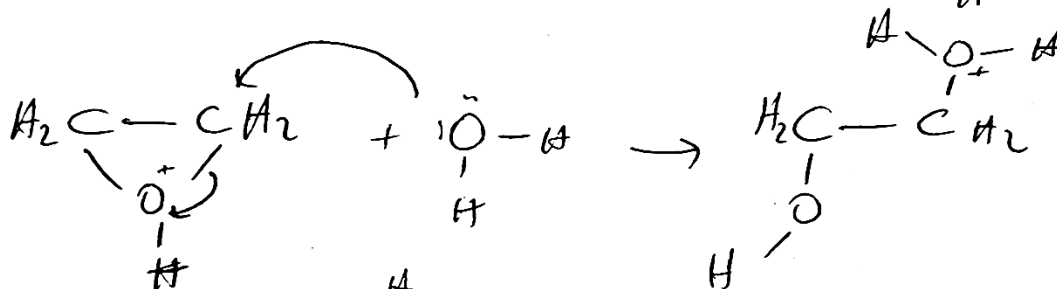
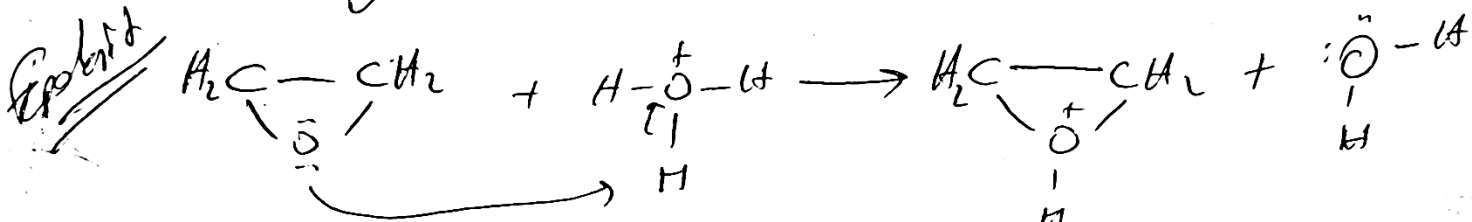


(4)

Epoksitlerin Tepkimeleri ()

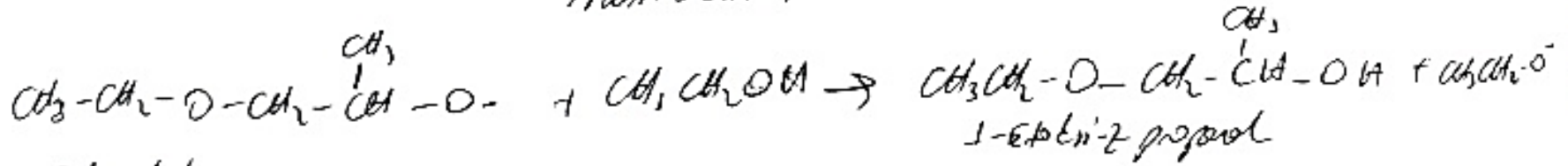
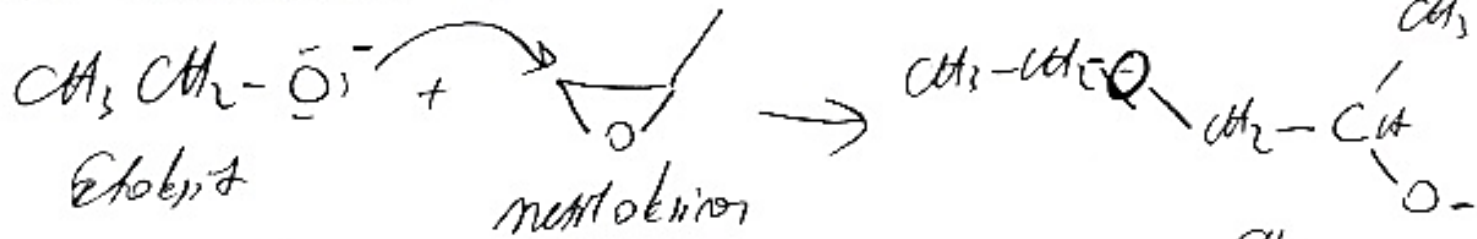
Üçlü halka son derece zengin olduğu için hem oksitlenme ve hem de bazlık tepkime verebilmektedirler.

Asit katalizli tepkimesi; Oksijenin protonlanması ile oluşan kolay açılan gruba dönüşür.

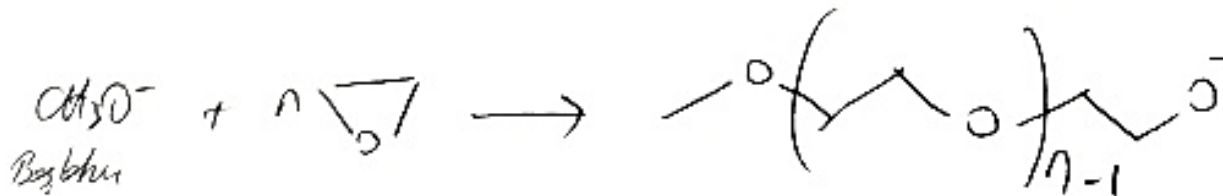
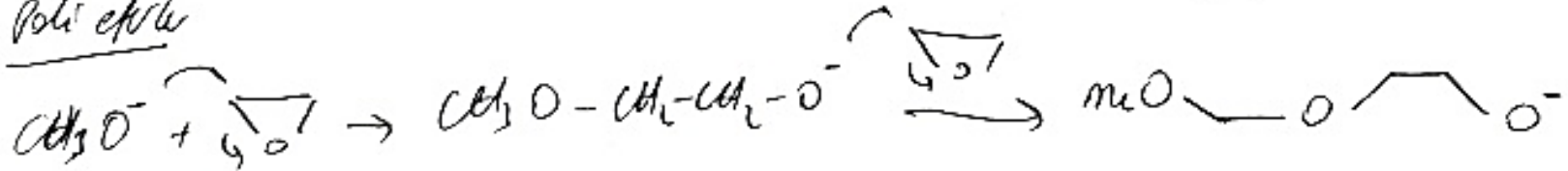


Baz katodiki halde oadimi.
 kuvvetli bazlar (nükleofilik) tepkime verebilmektedirler.

Sadece OH^- ve R-O^- gibi yalnz tabiki etkilere epoksi ile tepkime verebilmektedirler.



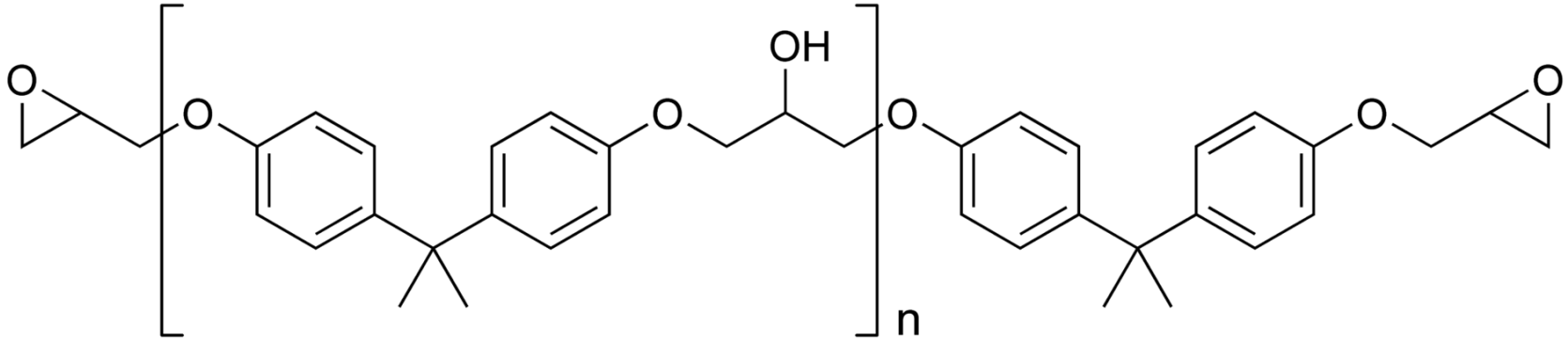
Poli epoksi



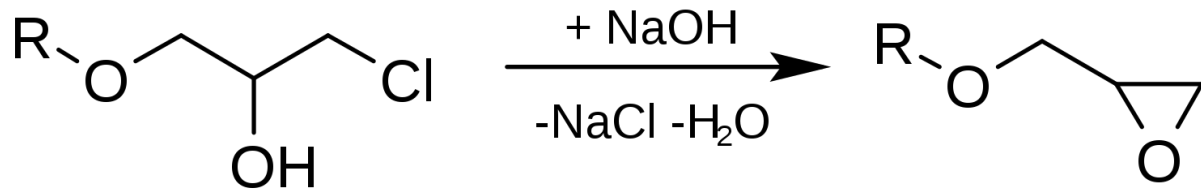
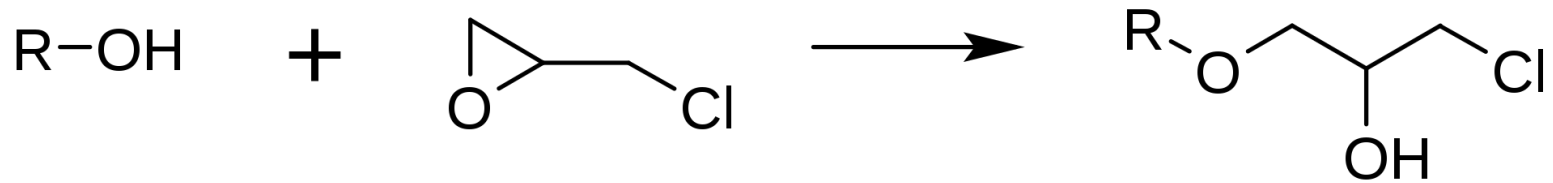
Bu polimerleme enjeksiyon polimerleme örnektir.



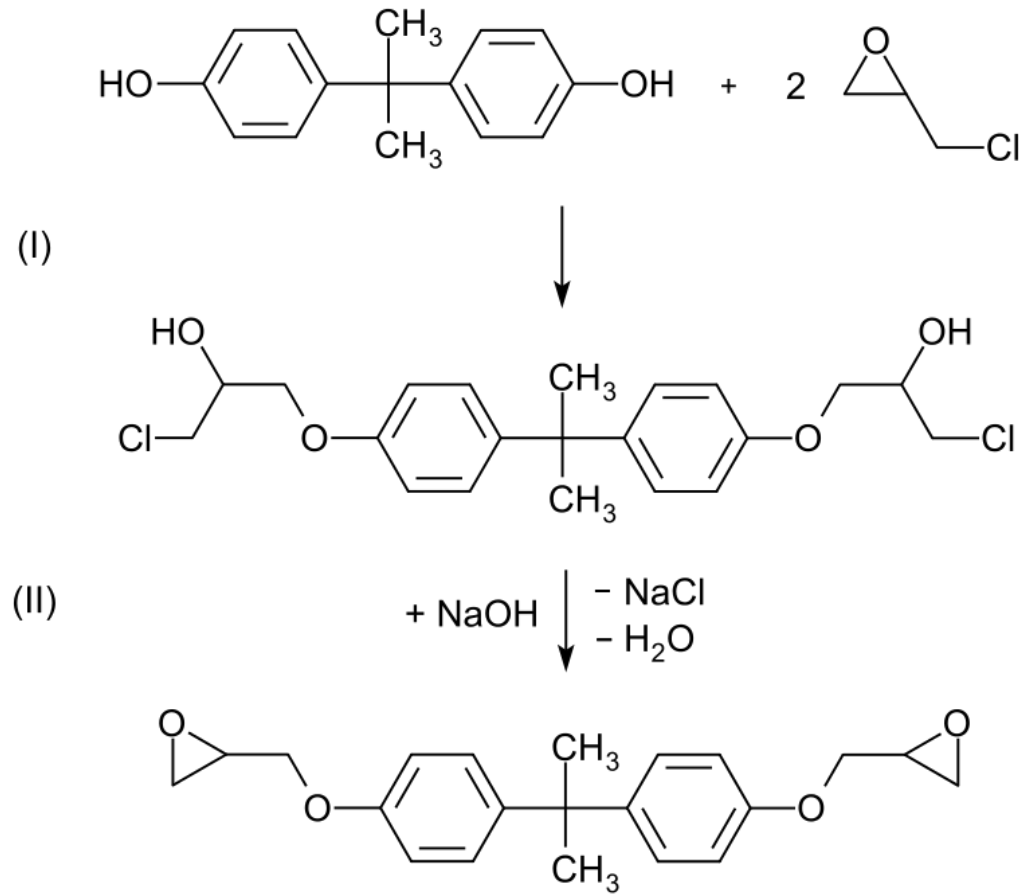
Bisphenol A epoxy resin



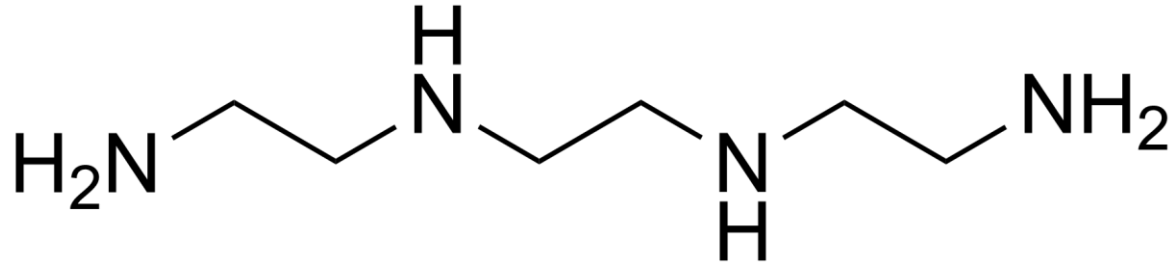
Bisfenol-A diglisidil eter epoksi reçinesi: Mol kütlesi düşük bir polieter. Son grupları epoksit halkalarıdır. n tekrar eden birim sayısı 1-25 arasında değişebilir.



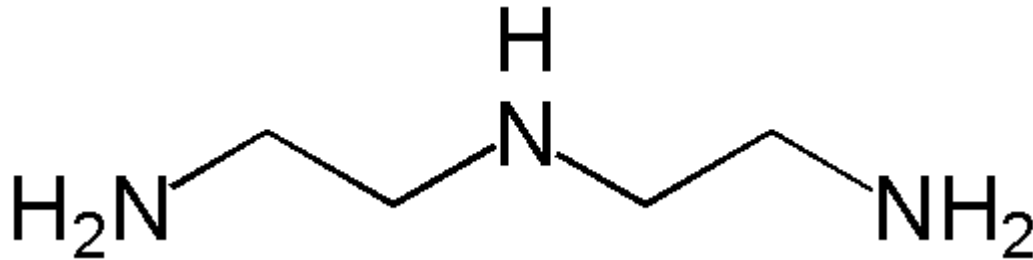
Epiklorohidrin'in alkolle tepkimesi ile halka açılımı ve sonrasında tekrar epoksit halkasının oluşumu.



Bisfenol A diglisidil eter sentezi.

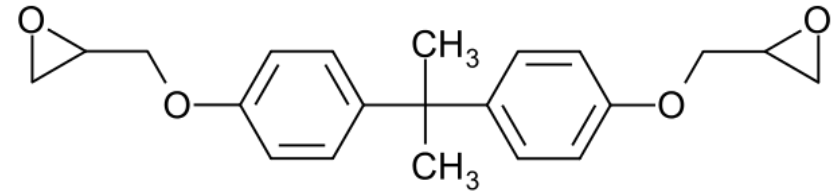
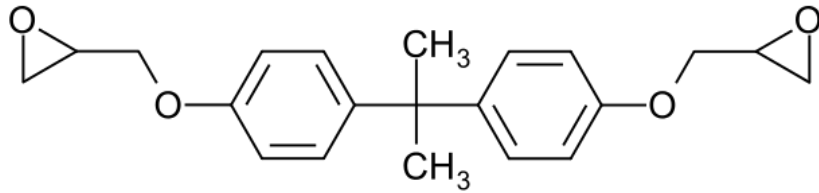
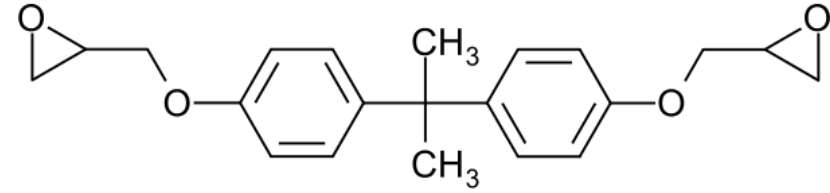
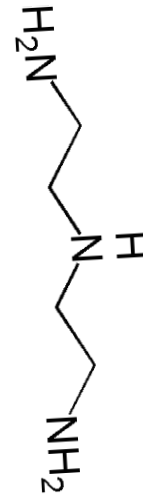
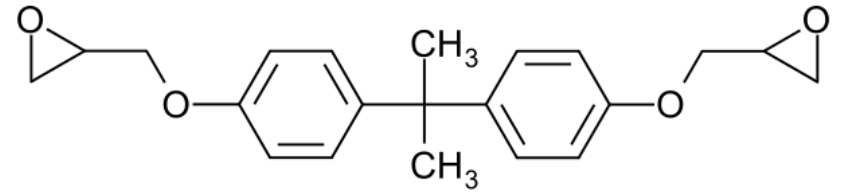
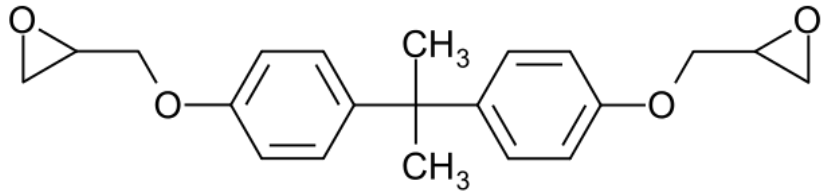


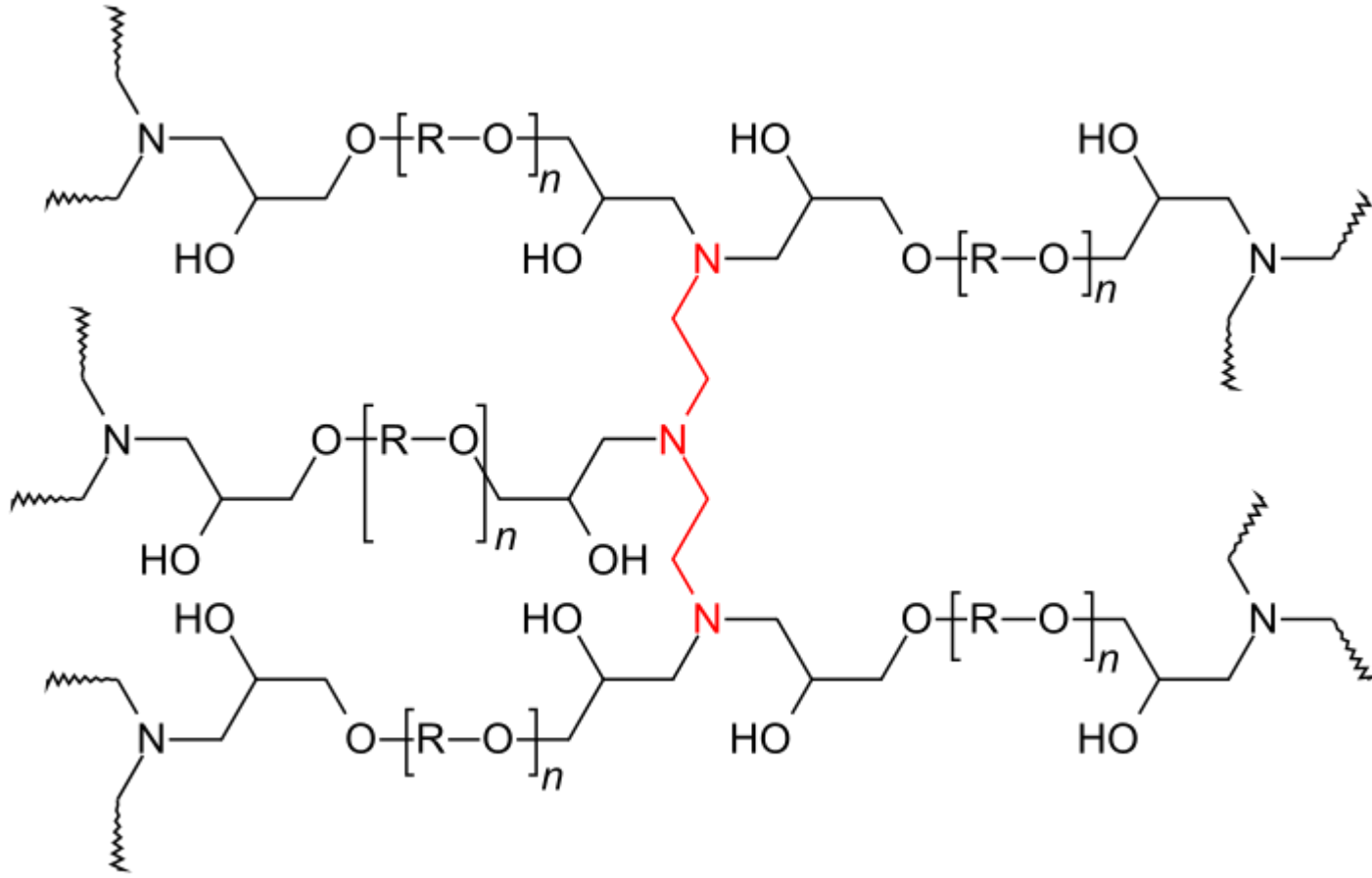
Tipik bir sertleştirici (çapraz bağlayıcı) TriEtilenTetraAmin TETA, a typical hardener. Amin grupları (NH ve NH₂) polimerizasyon esnasında epoksitle tepkimeye girerler.



DiEtilenTriAmin (DETA), epoksi yapıştırıcılar ve epoksi reçineler için yaygın kullanılan küreleme ajanlarındanındır.







Kürlenmiş epoksi yapıştırıcısı yapısı. Sertleştirici kırmızı ile reçine yapısı ise siyah ile gösterilmiş. Epoksit grupları sertleştirici ile tepkime girdikleri için gösterilmemektedirler. Polimer üzerindeki -OH grupları çapraz bağlanma sonucu oluşan polimerin yüzeye yapışmasını sağlamaktadır.