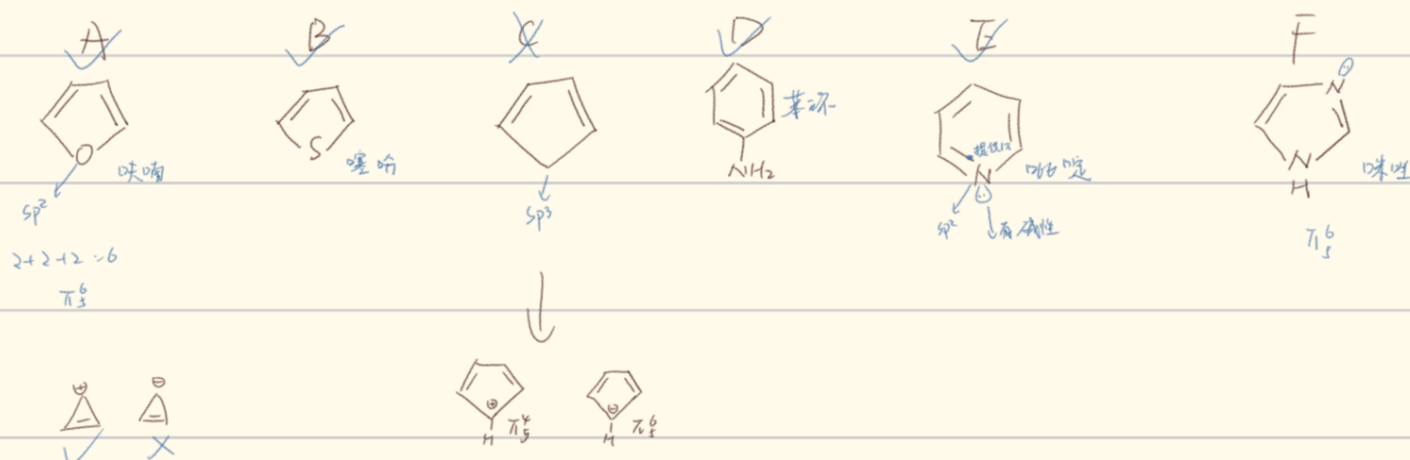


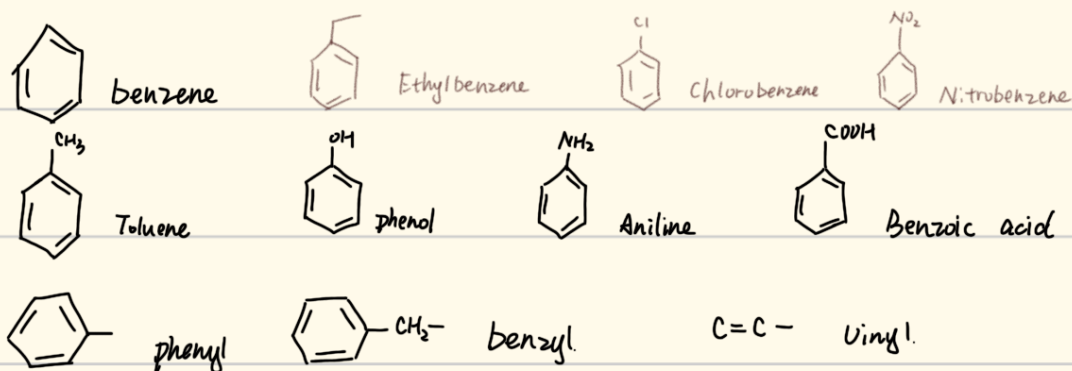
判断是否芳香性.

Hückel Rule. : ① 环状 + 平面 sp^2 杂化.

② π 电子 $4n+2$



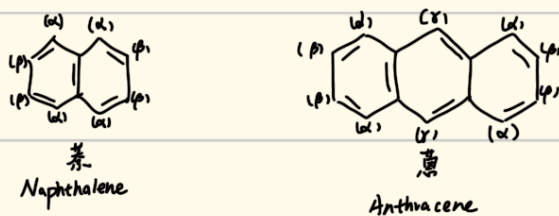
A.



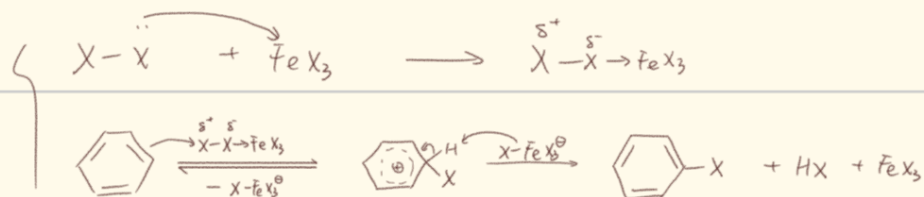
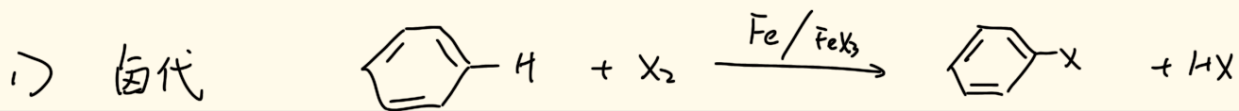
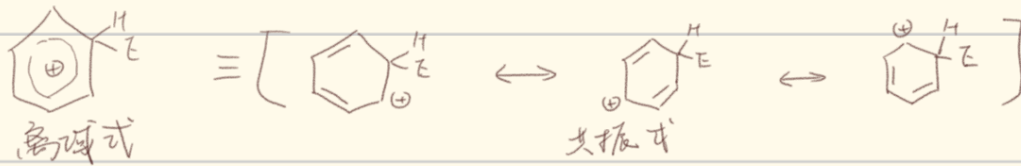
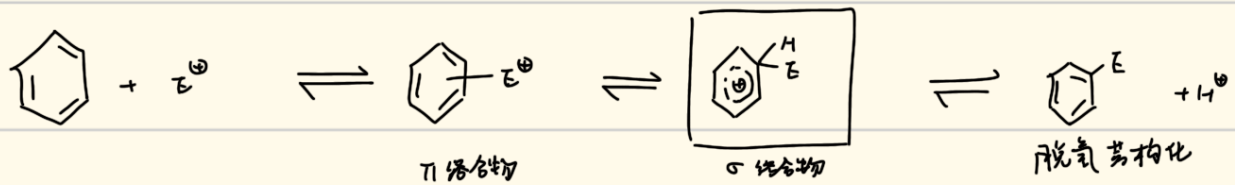
B.

邻位 间位 对位
 ortho- meta- para-

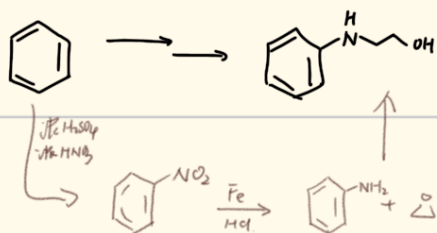
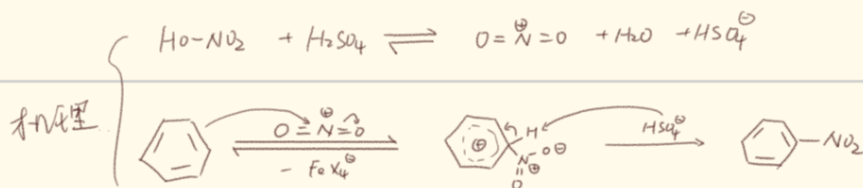
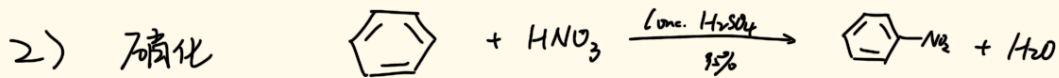
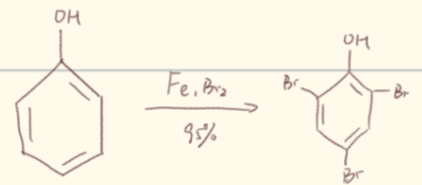
C.



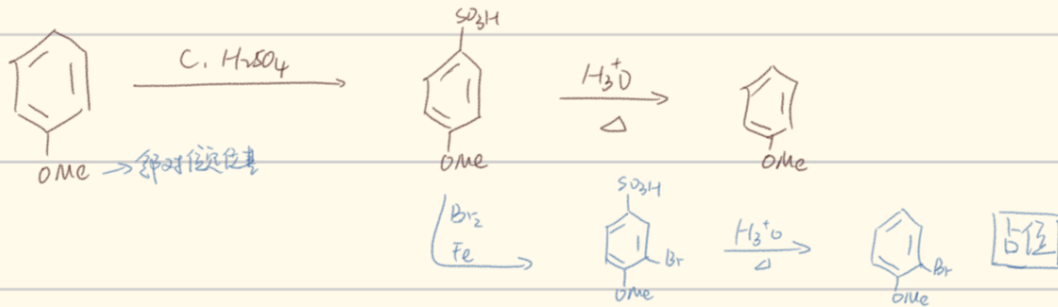
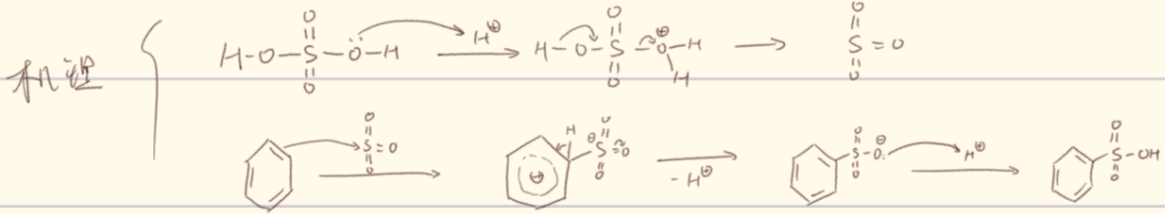
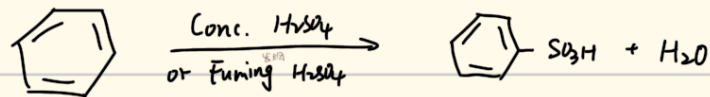
取代： (比加成更稳定)



Cl, Br, I 均可通过卤代引入, F 需用间接方法引入

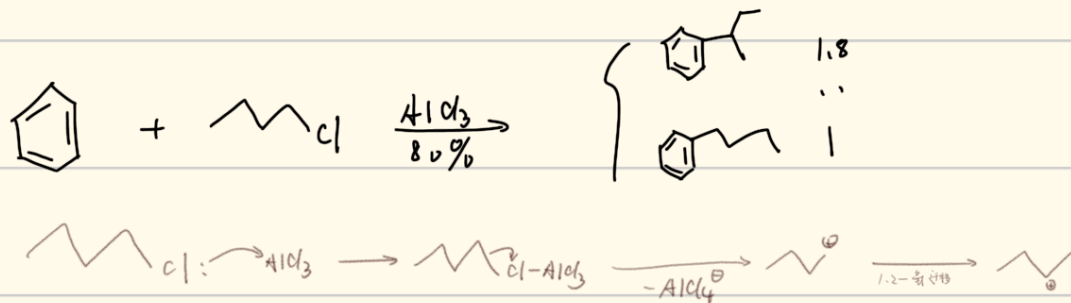
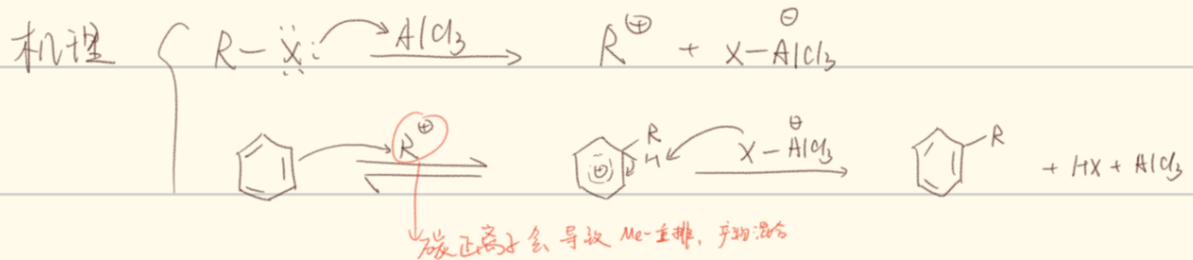
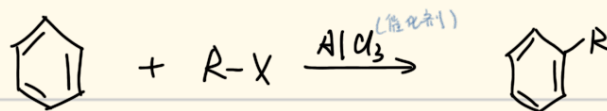


3) 磺化

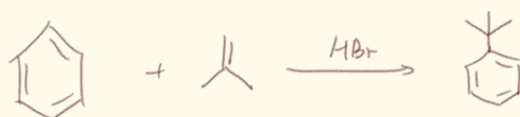


4) Friedel-Craft 反应

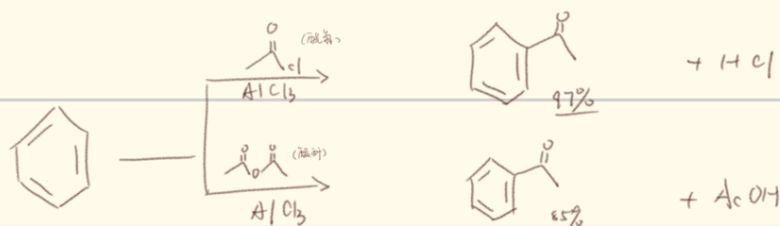
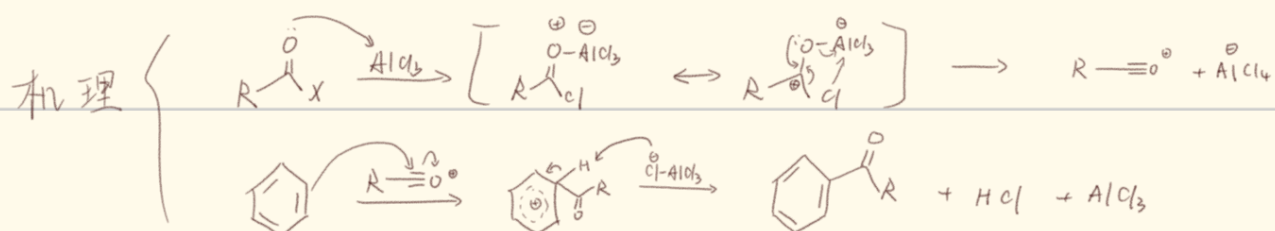
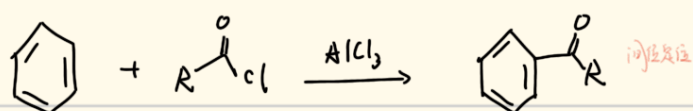
① 烷基化反应



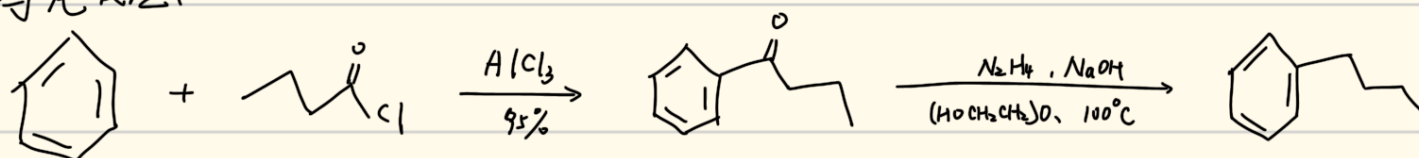
不局限 R-X 与 AlCl₃ : 只要产生 C⁺ 即可



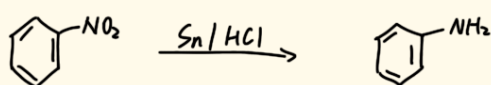
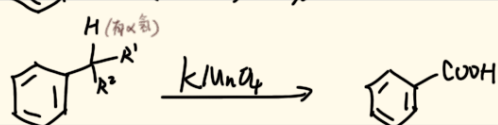
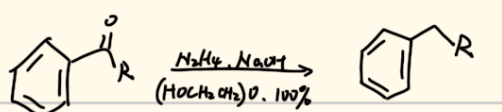
② 酰基化 (消耗更多 $AlCl_3 \rightarrow$ 酮仍可络合)

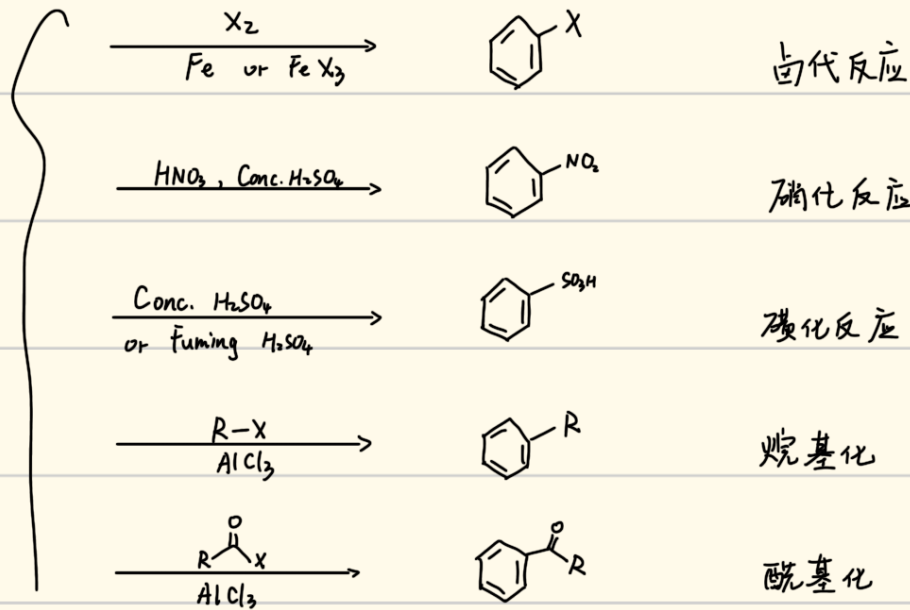
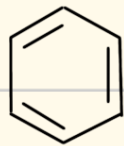


黄鸣龙反应:



无法直接取代基团





Friedel-Crafts 反应

1. 酸性

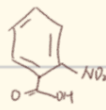
C max



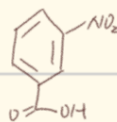
A



B



C



D

2. $\text{Cl}_2/\text{FeCl}_3$ 反应活性 (比较富电子)

C > B > A > D



A



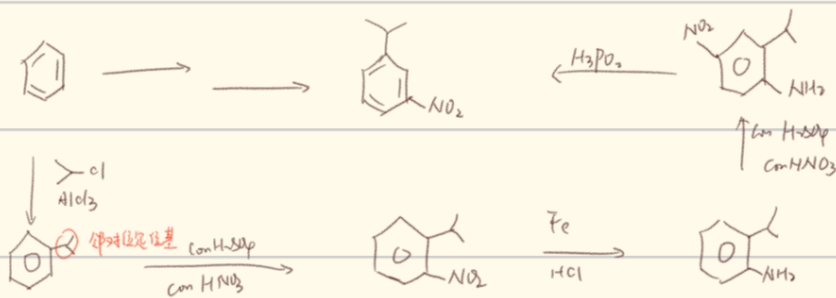
B



C



D



邻对位定位基
(推e⁻) (致钝)

强: $-NR_2, -NH_2, -OH$

中: $-OCH_3, -NHCOCH_3$

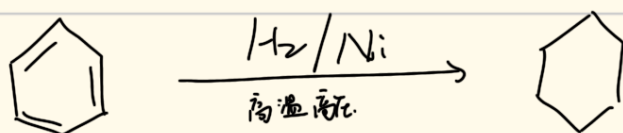
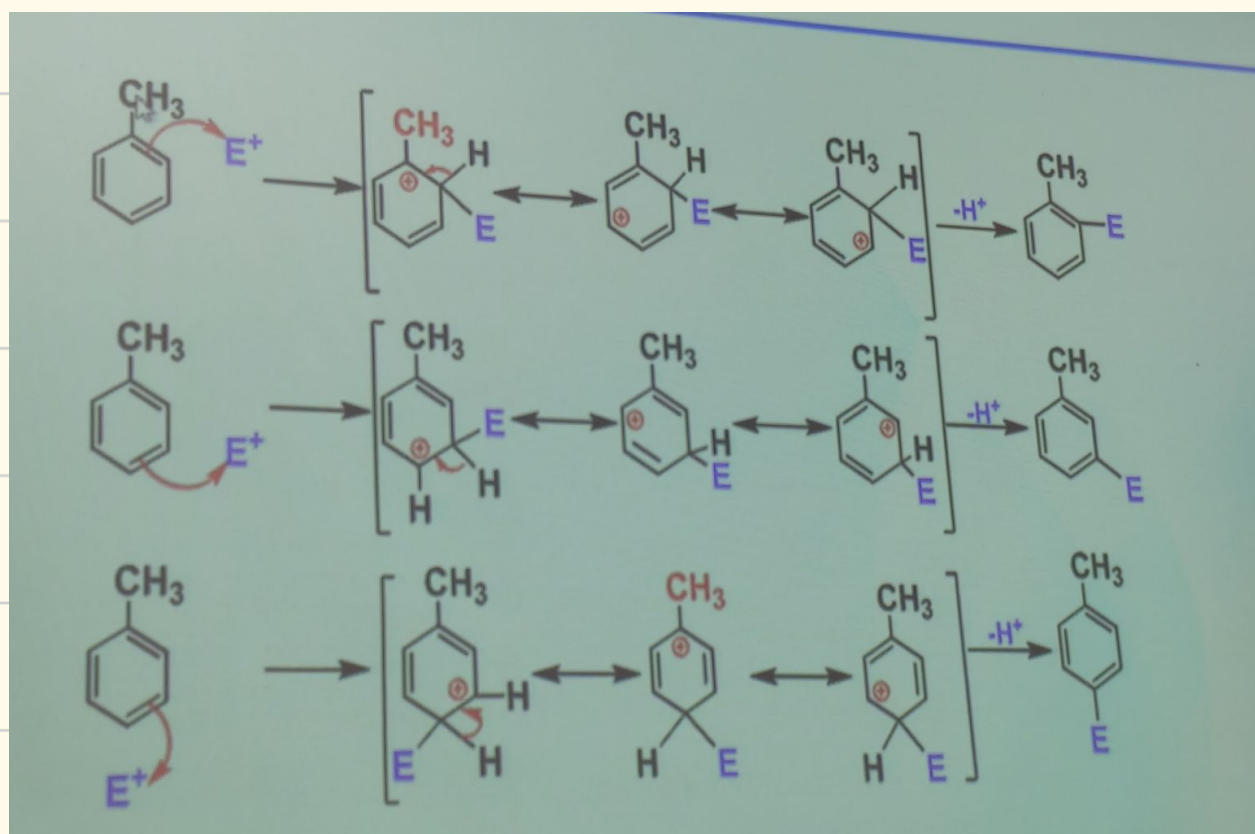
弱: $-CH_3, -C_6H_5$; $-X$ (致钝)

间位 (致钝)
(吸e⁻)

强: $-\overset{+}{N}R_3, -NO_2$

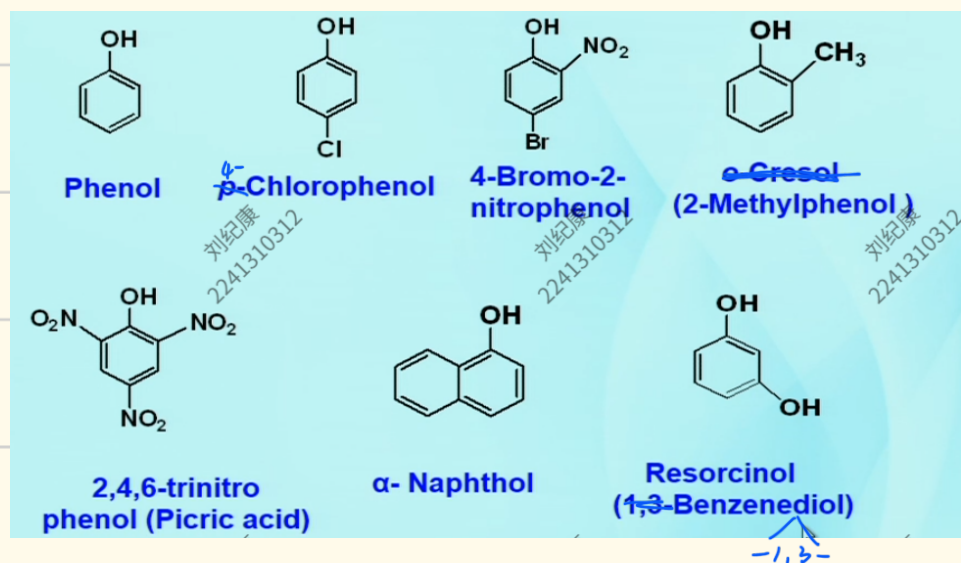
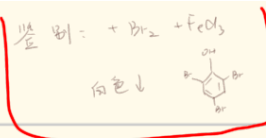
中: $-CN, -SO_3H$

弱: $-COCH_3, -COOH, -COOCH_3, -CHO$



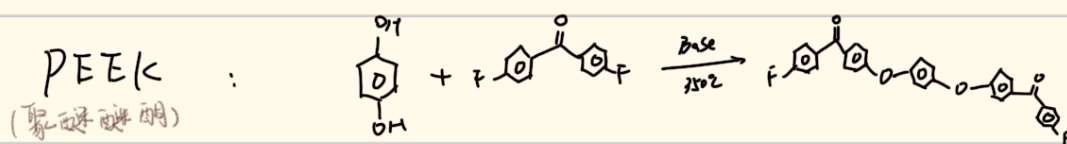
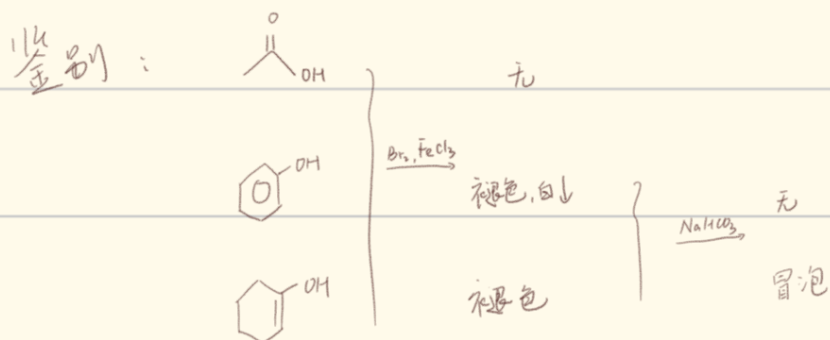
苯酚 phenol

OH 推电子
亲电反应 强于苯

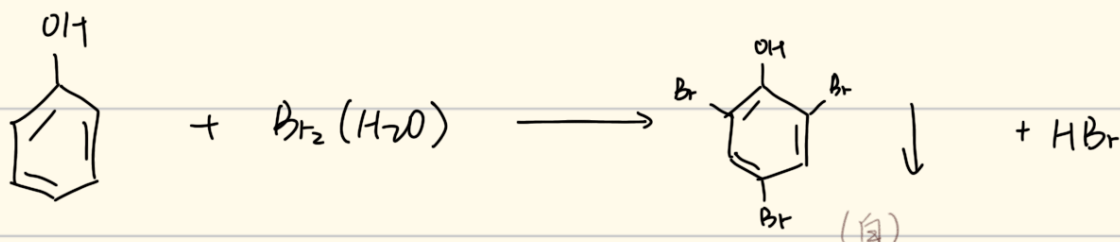
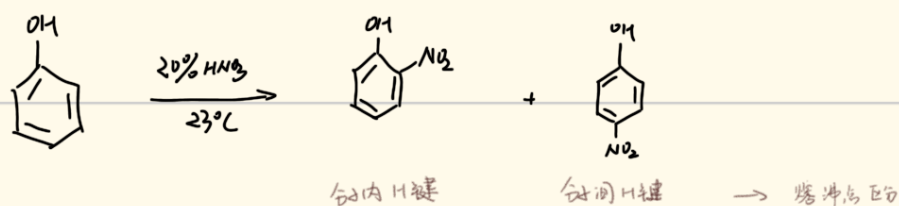


性质

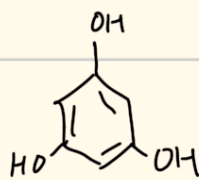
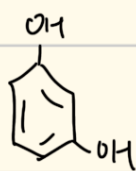
(1) 弱酸性 与 Na_2CO_3 反应 与 $NaHCO_3$ 不反应



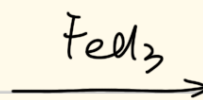
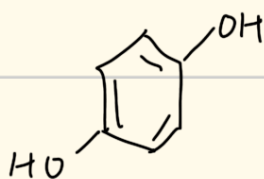
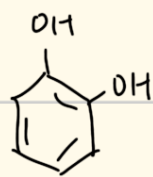
(2) -OH 强致活, 富电子



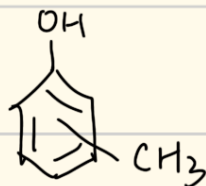
3) 络合变色
(鉴别酚)



紫

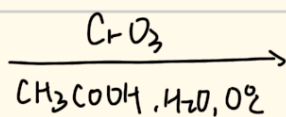


绿

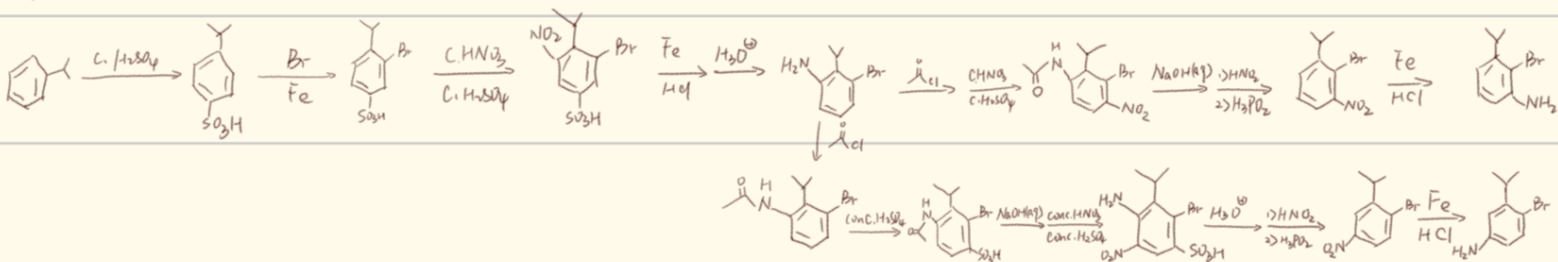
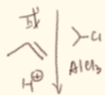
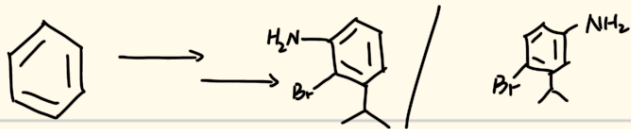
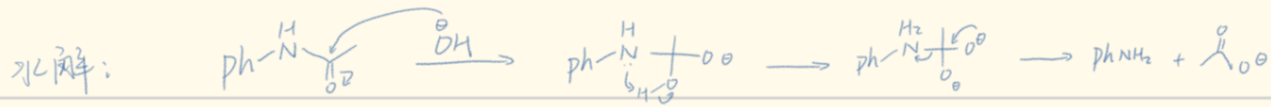
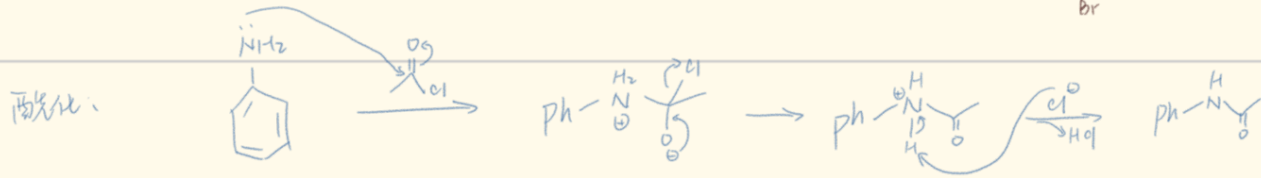
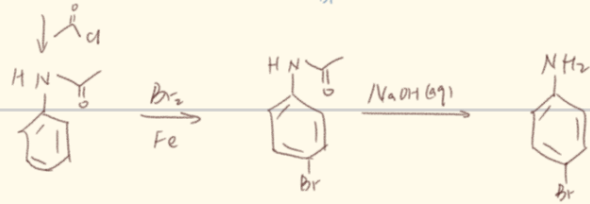
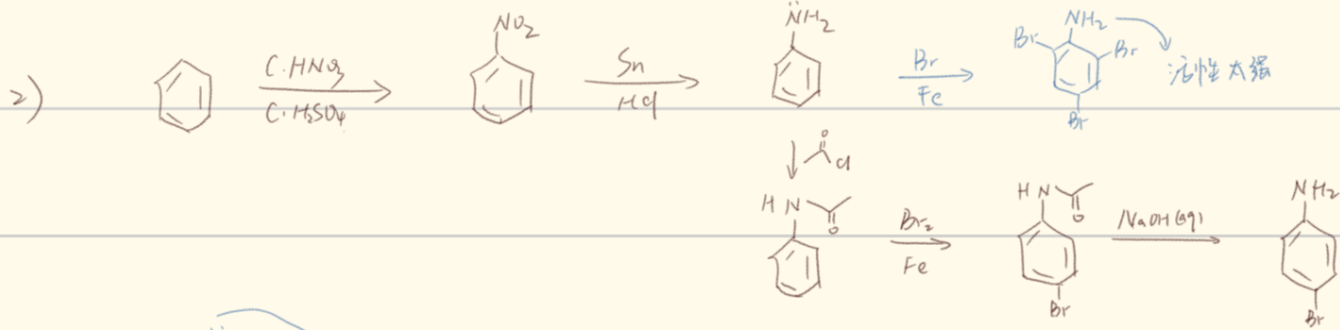
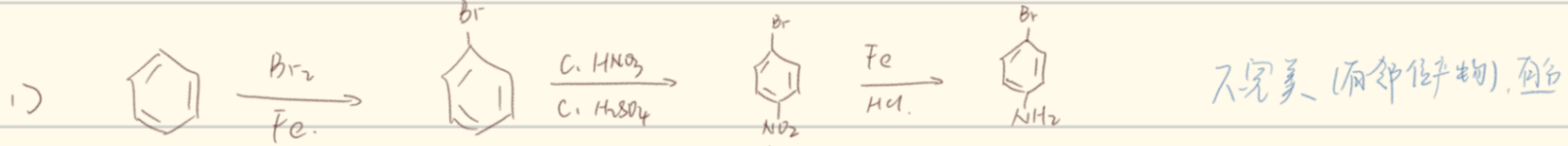
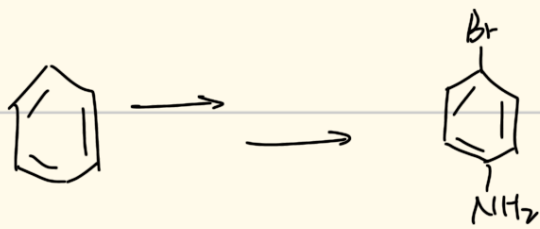


蓝

4) 氧化



对苯醌



去除氨基

