

30 Nitration and Friedel-Crafts – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English Write it 3 times (English)

catalyst

Friedel–Crafts
alkylation

Friedel–Crafts
acylation

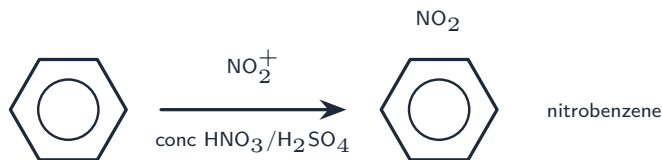
Recall

Two important ring reactions add a carbon group using an aluminium chloride **catalyst**.

New ideas

Read these first, then do the Practice.

■ 1 Nitration



In nitration, the acid mix makes the electrophile NO_2^+ , which replaces a hydrogen on the ring to give nitrobenzene.

■ 2 Friedel–Crafts

alkylation
adds an alkyl group
($\text{CH}_3\text{Cl} + \text{AlCl}_3$)

acylation
adds an acyl group
($\text{CH}_3\text{COCl} + \text{AlCl}_3$)

- **Friedel–Crafts alkylation** adds an alkyl group;
- **Friedel–Crafts acylation** adds an acyl group.

Watch out: the species that attacks the ring is the *electrophile* made first – NO_2^+ in nitration, or an alkyl/acyl cation in Friedel–Crafts. The AlCl_3 is a *catalyst*: it helps make the electrophile and is regenerated.

Practice

Try these in order.

30.6 In nitration, what is the *electrophile*? [1]

30.7 What product does nitration of benzene give? [1]

30.8 What does *Friedel–Crafts alkylation* add? [1]

30.9 What does *Friedel–Crafts acylation* add? [1]

30.10 What catalyst do the Friedel–Crafts reactions use? [1]

30.11 Challenge. Friedel–Crafts acylation needs an AlCl_3 catalyst. Explain the catalyst's role in generating the electrophile. [2]
