

Chemguide – questions

ACYL CHLORIDES: REACTION WITH BENZENE

- This reaction is known as *Friedel-Crafts acylation*. What do you understand by the term *acylation*?
 - Describe how you would convert benzene into phenylethanone, $C_6H_5COCH_3$. Give the conditions for the reaction, but no description of the purification of the product is necessary.
 - Name the other product of the reaction you described in part (b).
- Friedel-Crafts acylation is a useful way of attaching carbon-containing groups to a benzene ring. The $-COCH_3$ group (or other acyl group if you start with a different acyl chloride) can be modified to give other groups.
 - One modification is known as the Clemmensen reduction, and converts the carbon-oxygen double bond into a CH_2 group. Give the conditions for the Clemmensen reduction.
 - In this case, the overall effect of doing a Friedel-Crafts acylation followed by the Clemmensen reduction would be an ethyl group attached to a benzene ring.

It is perfectly possible to attach an ethyl group to a benzene ring by treating benzene with chloroethane in the presence of an aluminium chloride catalyst. So why do we normally use this more roundabout (and time-consuming) acylation-followed-by-reduction route instead?