

Chemguide – answers

NUCLEOPHILIC ADDITION: REDUCING C=O

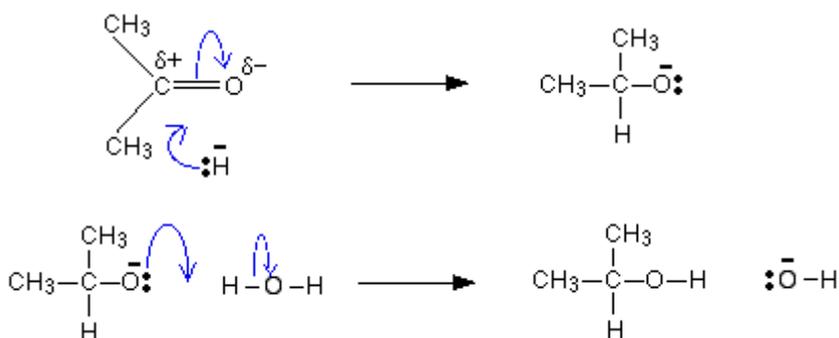
1. a) The carbon-oxygen double bond is strongly polarised because oxygen is more electronegative than carbon; the carbon atom becomes fairly positively charged. The lone pair on a hydride ion is attracted towards this carbon, and moves to form a bond with it. In the process, the electrons in the pi part of the double bond are forced out entirely onto the oxygen, leaving it negatively charged.

In the second stage, one of the lone pairs on the negative oxygen moves to form a bond with a hydrogen ion from the acid used to acidify the mixture.

(In case you are wondering why I haven't drawn this properly showing the removal of a hydrogen ion from a hydroxonium ion, H_3O^+ , there seems little point. The only Exam Board that I am aware of that wants this (already incorrect) mechanism uses the simplification.)

b) primary

2. a)



b) secondary