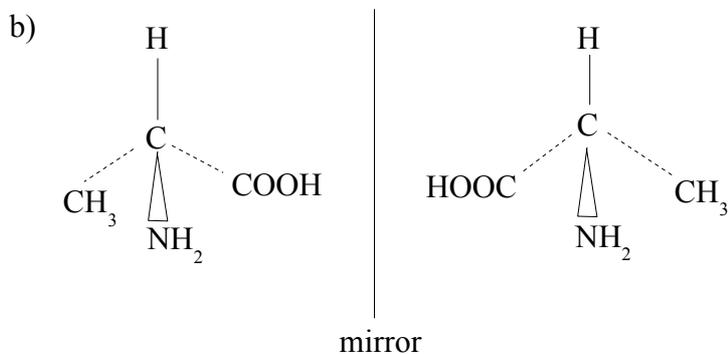


## Chemguide – answers

### AMINO ACIDS: INTRODUCTION

- A: 2-aminoethanoic acid, glycine  
B: 2-aminopropanoic acid, alanine
- A zwitterion is a compound with no overall charge, but containing separate parts which are positively and negatively charged. Amino acids have an amino group which is basic and can accept hydrogen ions. They also have an acid group which can donate hydrogen ions. A hydrogen ion therefore transfers from the COOH group to the NH<sub>2</sub> group giving the zwitterion  $\begin{array}{c} \text{NH}_3^+ \\ | \\ \text{R-CH-COO}^- \end{array}$
  - There will be ionic bonds between the separate molecules, and these take more energy to break than other intermolecular forces.
  - There are attractions between the very polar water molecules and the zwitterions which help to supply the energy needed to break up the amino acid crystal.
  - There aren't enough attractions between the organic solvent molecules and the amino acid to provide the energy to break the ionic bonds in the crystal.
- Each has a carbon atom attached to four different groups.



It doesn't matter where you attach the various groups in the first molecule, but the second one must be an accurate mirror image of it. Make sure that you attach the C of the COOH group to the central carbon – otherwise it is wrong! There are other ways you can show this – for example, by having two lines in the plane of the paper and one going back in and one coming out. The method above just happens to be the one I always use.

- Because the isomers have different spatial arrangements of their groups, if one fits into the active site of an enzyme, the other one probably won't.