

- Consider the boiling points of the compounds 1-propanol, 1-propanethiol and 1-propaneselenol shown in the table below?

| Compound | CH ₃ CH ₂ CH ₂ OH | CH ₃ CH ₂ CH ₂ SH | CH ₃ CH ₂ CH ₂ SeH |
|---------------------|--|--|---|
| Boiling point (° C) | 97.2 | 67.8 | 147.0 |

With reference to intermolecular forces, explain briefly why the boiling points increase in the order CH₃CH₂CH₂SH < CH₃CH₂CH₂OH < CH₃CH₂CH₂SeH.

Polarisability of atoms increases as the size of the atoms increase. The greater the polarisability, the stronger the dispersion forces. On this basis, the expected boiling point order would be C₃H₇OH < C₃H₇SH < C₃H₇SeH.

C₃H₇OH also has hydrogen bonding between the OH groups. H-bonding is a stronger intermolecular force than dispersion forces and this increases the boiling point of C₃H₇OH to be above that of C₃H₇SH. The effect is not enough to push it above the boiling point of C₃H₇SeH.