

- Explain, in terms of chemical bonding and intermolecular forces, the following trend in melting points: $\text{CH}_4 < \text{I}_2 < \text{NaCl} < \text{silica (SiO}_2)$

3

There are only dispersion forces between the molecules in CH_4 and I_2 . The I atom is a large, many-electron atom so its electron cloud is more easily polarised than the C or H in CH_4 and therefore I_2 has stronger dispersion forces and the higher melting point. NaCl is an ionic compound with strong coulombic attraction between the Na^+ ions and the Cl^- ions packed together in the solid. Silica is a covalent network solid. Melting it requires breaking of the very strong covalent Si–O bonds, so it has the highest melting point.