

Solutions

Each answer shows the steps, then the **result**.

2.1

- The delocalized (free) electrons

2.2

- Layers of metal cations can slide over each other while the delocalized electrons still hold them together, so the metal deforms without breaking

2.3

- Substitutional and interstitial

3.1 C

- cations in a sea of delocalized electrons

3.2

(a)

- Interstitial — carbon atoms are much smaller than iron and fit in the gaps between iron atoms

(b)

- The carbon atoms disrupt the regular layers so they cannot slide easily, making the metal harder

3.3

- In a metal the delocalized electrons are mobile in both the solid and the molten state; an ionic compound needs its ions to move, which happens only when molten or dissolved