Representing elements and compounds: teacher guidance

These **In context** worksheets ask learners to use their knowledge of representing elements and compounds in an applied context, building their confidence and capability to face exam questions. Calculation questions are included to give opportunities to practise mathematical skills within this topic. The worksheets are available at Foundation and Higher level and as fully editable versions, giving you the flexibility to select the questions most relevant to a particular lesson.

Also available to assess this topic:

- **Review my learning worksheets**: available with three levels of scaffolded support to help build confidence in every learner. Use before, during or after teaching the relevant topic to understand progress and identify misconceptions, **rsc.li/44igB7V**.
- **Knowledge check worksheets: select from Foundation and Higher level** to assess learners' knowledge and understanding of this topic at the end of a period of teaching or as revision, **rsc.li/4uSvyue**.

Answers

Foundation

1 (a) giant covalent

(b) relative formula mass silicon dioxide $= 28 + (2 \times 16)$
$= 60$

(c) percentage silicon in silicon dioxide $= \frac{28}{60} \times 100$
$= 46.6\%$

2 (a) **A**, **B**, **C**

(b) **A**, **B**, **C**

(c) **B**, **C**

(d) **C**

3 (a) relative formula mass iron(II) oxide $= 56 + 16$
$= 72$

(b) Since 144 g FeO produces 32 g O_2,
200 g FeO produces $\frac{32}{144} \times 200$ g O_2

$= 44.4$ g O_2

4 (a) $TiCl_4(l) + 2Mg(l) \longrightarrow Ti(s) + 2MgCl_2(l)$

(b) relative formula mass $TiCl_4 = 48 + (4 \times 35.5)$
$= 190$

Higher tier

1 (a) i. Al_2O_3
ii. SiO_2
(b) empirical formulas
(c) i. SnO_2
ii. relative formula mass indium oxide $= (2 \times 115) + (3 \times 16)$
$= 278$
iii. percentage by mass indium in indium oxide $= \frac{230}{278} \times 100$
$= 82.7\%$ (to one decimal place)

2 (a) Ta_2O_5
(b) relative formula mass tantalum(V) oxide $= (2 \times 181) + (5 \times 16)$
$= 442$
(c) 442 g Ta_2O_5 = 1 mol
2210 g $= \frac{2210}{442}$ mol
= 5 mol
1 mol Ta_2O_5 → 2 mol Ta
5 mol Ta_2O_5 → 10 mol Ta
Mass 10 mol Ta = 181 × 10 g
= 1810 g
(d) i. Li_3TaO_4
ii. $LiTaO_3$

3 (a) $SiO_2(l) + 2C(s) \longrightarrow Si(l) + 2CO(g)$
(b) i. 60 g SiO_2 reacts with 24 g C
120 g SiO_2 reacts with 48 g C

Alternatively:
1 mol SiO_2 reacts with 2 mol C
M_r SiO_2 = 28 + 32 = 60
60 g SiO_2 = 2 mol

2 mol SiO_2 reacts with 4 mol C
4 mol C = 48 g

ii. M_r SiO_2 = 60
120 g SiO_2 = 2 mol
From the equation, 1 mol $SiO_2 \longrightarrow$ 2 mol CO
2 mol $SiO_2 \longrightarrow$ 4 mol CO
4 mol CO occupies 4 × 24 dm^3 = 96 dm^3
(c) percentage atom economy $= \frac{28}{84} \times 100$
= 33.3%

4 (a)

Compound	Chemical formula
neodymium(III) chloride	$NdCl_3$
neodymium(III) oxide	Nd_2O_3
neodymium(III) sulfate	$Nd_2(SO_4)_3$

(b) i. $NdCl_2$
ii. NdS