SCIENCE FOUNDATIONS

Naming molecular compounds

Difficulty level: Intermediate

Science Foundations

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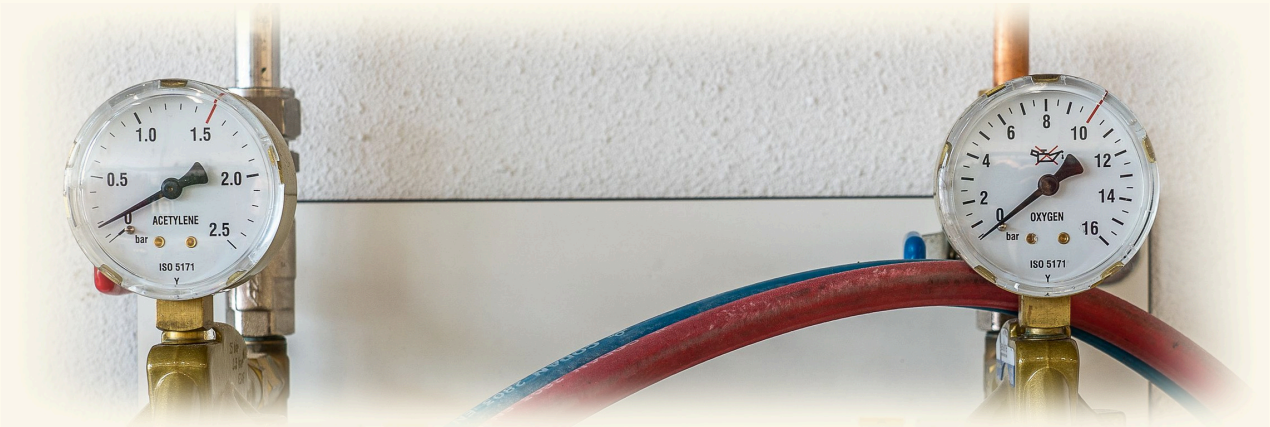
Overview of the concept

This is how you tell carbon monoxide from carbon dioxide on a warning label, because the name itself counts how many oxygen atoms each gas carries. A safety officer reading a gas cylinder label knows at a glance whether it holds one oxygen per carbon or two, and that difference decides how dangerous it is. A student reading a chemistry question can work out the formula straight from the name. Knowing molecular naming tells you how to read a chemical name as a count of atoms, not just a word to memorise.



Rule

Naming molecular compounds: use the prefixes mono (1), di (2), tri (3), tetra (4), penta (5), and hexa (6). Give the first element a prefix only if there is more than one of it, and never use mono on the first element. Always give the second element a prefix and end its name in -ide.

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Worked examples

EXAMPLE 1

Q Name CO_2.

SOLUTION

Split it: 1 carbon, 2 oxygen.

First element: one carbon, so no prefix: carbon.

Second element: two oxygens, prefix di, ending -ide: dioxide.

The result is carbon dioxide.

EXAMPLE 2

Q Name N_2O_5.

SOLUTION

Split it: 2 nitrogen, 5 oxygen.

First element: two nitrogens, prefix di: dinitrogen.

Second element: five oxygens, prefix penta, ending -ide: pentoxide.

The result is dinitrogen pentoxide.

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Practice questions

1 Name SO_2.

- **A** Sulfur trioxide
- **B** Sulfur dioxide
- **C** Sulfur monoxide
- **D** Carbon dioxide

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2 What is the formula of carbon dioxide?

- **A** CO
- **B** CO_2
- **C** C_2O
- **D** CO_3

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3 Name N_2O_4.

- A Dinitrogen pentoxide
- B Nitrogen tetroxide
- C Dinitrogen dioxide
- D Dinitrogen tetroxide

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4 What is the formula of dinitrogen tetroxide?

- A N_2O_4
- B NO_4
- C N_4O_2
- D N_2O_5

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5 Which name means one carbon atom and four chlorine atoms?

- A Carbon tetrachloride
- B Carbon tetroxide
- C Tetracarbon chloride
- D Carbon chloride

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6 What prefix means 2?

- A Mono-
- B Tri-
- C Di-
- D Tetra-

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7

How many atoms does the prefix tetra- mean?

A 3

B 4

C 5

D 6

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Does the first element get mono?

A Yes

B No

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9 **Name H_2O by this system.**

- **A** Hydrogen dioxide
- **B** Dihydrogen monoxide
- **C** Dihydrogen dioxide
- **D** Monohydrogen monoxide

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10 **Why is CO called carbon monoxide and not monocarbon monoxide?**

- **A** Mono is never used on the first element
- **B** Carbon never takes a prefix
- **C** Oxygen always takes mono-
- **D** There is only one carbon atom

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ANSWER KEY

1. Sulfur dioxide

2. CO_2

3. Dinitrogen tetroxide

4. N_2O_4

5. Carbon tetrachloride

6. Di-

7. 4

8. No

9. Dihydrogen monoxide

10. Mono is never used on the first element

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