

Ions and Mass-Spectrometry Concepts

Student Worksheet | g09_u03_w12

I can: count particles in ions, connect electron loss/gain to charge, and interpret simplified mass-spectrum peaks with stated limits.

Vocabulary: ion, cation, anion, charge, mass-to-charge ratio, peak, abundance, spectrum, calibration.

1. Define ion.

2. Define cation and anion.

3. Does forming an ion change protons?

4. How many electrons in Na^+ if $Z = 11$?

5. How many electrons in Cl^- if $Z = 17$?

6. What charge has 12 p and 10 e?

7. What charge has 8 p and 10 e?

8. Write ion notation for 13 p and 10 e.

9. For ${}^{24}_{12}\text{Mg}^{2+}$, count p,n,e.

10. For ${}^{16}_8\text{O}^{2-}$, count p,n,e.

11. Why does electron loss make positive charge?

12. Does ion formation usually change mass number?

13. A simplified spectrum has peaks at 35 and 37. What could they represent?

14. Why does a peak position not automatically equal exact isotope mass?

15. Why can peak height be only an estimate of abundance?

16. State one safe way to learn spectra without operating an instrument.

17. List two model limitations of a classroom stick spectrum.

18. A 35 peak is 75 units tall and 37 peak 25. Estimate fractional abundances under an explicitly stated equal-response assumption.

19. A 3+ ion has 26 p. How many electrons?

20. Critique: “mass spectrometry photographs atoms and directly reads their identities.”
