

4.2 STRUCTURE OF THE NUCLEAR ATOM

Section Review

Objectives

- Identify three types of subatomic particles
- Describe the structure of atoms according to the Rutherford model

Vocabulary

- electrons
- cathode ray
- protons
- neutrons
- nucleus

Part A Completion

Use this completion exercise to check your understanding of the concepts and terms that are introduced in this section. Each blank can be completed with a term, short phrase, or number.

- Dalton theorized that atoms are indivisible, but the discovery of 1 particles changed this theory. Scientists now know that atoms are made up of electrons, which have a 2 charge; 3 4, which have a positive charge; and 4, which are neutral. The latter two particles are found in the 5 of the atom. It was 6 who discovered the nucleus of the atom. The nucleus, which has a 7 charge, occupies a very small volume of the atom. In contrast, the negatively charged 8 occupy most of the volume of the atom.

Part B True-False

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

- ____ 9. According to Dalton's atomic theory, atoms are composed of protons, electrons, and neutrons.
- ____ 10. Atoms of elements are electrically neutral.
- ____ 11. The mass of an electron is equal to the mass of a neutron.
- ____ 12. The charge on all protons is the same.

Part C Matching

Match each description in Column B to the correct term in Column A.

Column A

- ____ 13. electrons
- ____ 14. cathode ray
- ____ 15. protons
- ____ 16. neutrons
- ____ 17. nucleus

Column B

- a. stream of electrons produced at the negative electrode of a tube containing a gas at low pressure
- b. the central core of an atom, which is composed of protons and neutrons
- c. negatively charged subatomic particles
- d. subatomic particles with no charge
- e. positively charged subatomic particles

Part D Questions and Problems

Answer the following questions in the space provided.

18. Which subatomic particles are found in the nucleus of an atom?

19. Which subatomic particles are charged?

20. Describe Rutherford's model of the atom, including the location of protons, neutrons, and electrons with respect to the nucleus. How does this model explain the deflections of a beam of alpha particles aimed at a sheet of gold foil?
