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Alpha Particles

Alpha particles are a type of ionizing radiation discovered by Sir Ernest Rutherford in 1899. Sir Rutherford named these particles after the first letter of the Greek alphabet *alpha*. They consist of two protons and two neutrons which is identical to the helium nucleus. Because alpha particles have two neutrons and two protons, alpha particles have a positive electric charge.

Alpha particles are ejected from the nucleus of unstable radioactive elements as they decay. Elements and isotopes that give off alpha particles are called alpha emitters.

Alpha particles travel at about 15,000 kilometres per second but as far as subatomic particles go, the alpha particle is quite heavy so it will only travel a few centimetres in air and will not penetrate skin or clothing so it poses little health risk if it remains outside the body. If alpha emitting elements enter the body through cuts or by inhaling them, however, the health risks can be quite severe. People who smoke actually inhale the radioactive isotope polonium-210, a naturally occurring alpha emitter found in tobacco, into their lungs which greatly increases the risk of lung cancer.

Alpha emitters are radioactive isotopes which emit alpha particles. Below is a list of some alpha emitting radioactive isotopes.

- Americium-241
- Polonium-210
- Plutonium-236
- Radium-226
- Radon-222
- Thorium-232
- Uranium-238

The alpha emitters listed above are commonly used in industrial applications. Radium-226 is used to treat cancer and plutonium-236 can be used to produce nuclear weapons.



Alpha Particles

Name: _____ Period: _____ Date: _____

Read the information found in the “Alpha Particles” section in the *What is Radiation?* module on the **Nuclear Technology: Exploring Possibilities Website**, then answer the following questions.

Who discovered alpha particles?

What subatomic particles make up an alpha particle?

What type of electric charge do alpha particles have?

Where do alpha particles come from?

What is the name given to elements and isotopes that give off alpha particles?

How fast do alpha particles travel and how far will they go?

What will stop an alpha particle?

How can alpha particles pose a health risk?
