Types of radiation

There are two main types of radiation:

1-Ionizing radiation

It is called this because this type of radiation has the ability to ionize the atoms that pass through it, such as electromagnetic radiation (X-ray gamma and cosmic rays) and particle radiation such as (beta particles, alpha, neutrons, and protons).

2-**Non-Ionizing radiation**

It has no ability to ionize the atoms it passes through, such as radio and television waves, radar waves, short wavelengths (microwaves), infrared, ultraviolet, normal light, and laser rays.

Natural radiation in the soil

Uranium, thorium and radium are heavy radioactive minerals that originate naturally in the soil where uranium represents the most present in the Earth's crust and also tends to spread through the soil because the rocks in the outer crust suffered from weathering and erosion factors (water, air, plants) and as a result of these processes and other various factors formed Soil .The basic concept of soil pollution depends on information related to the process of transportation and accumulation away from the site of contamination because the accumulation and movement of radioactive materials depends on the interaction of materials and compound with the solid part of the soil and that the type of this reaction reflects the ability of the soil to retain radioactive materials and on the other hand the rate of precipitation and the amount of water Irrigation, the type of cultivated plants and soil management

processes lead to the movement of radioactive pollutants to groundwater or its transmission to plants or other media, such as water and air

The radioactivity of the soil models includes radionuclides that belong to the series of uranium, the most important of which is radium, which has a concentration in the soil (6-7Bq/Kg), There are small amounts to ^{137}Cs not exceed(10Bq/Kg).

There are three natural series from which most radioactive isotopes originate naturally:

1-Uranium Series -238: The isotope dissolves ^{238}U through a series of 14 radionuclides that end up in stable ^{206}Pb isotope.

2-Thorium Series-232: ^{232}Th isotope dissolves through a series consisting of 15 radionuclides to a stable ^{208}Pb isotope.

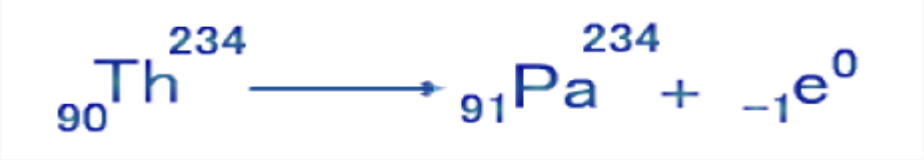
3-The Alkatnium Series-235: the isotope ^{235}U is sequentially dissolved through a series of 11 radioactive nuclei that ends in stable ^{207}Pb isotope.

We note that each of these series begins with an element with a very long half-life and eventually decays to reach a stable lead counterpart and it is assumed that another series of neptunium has been found on the ground in earlier times but has decayed more quickly than it is revealed in our time

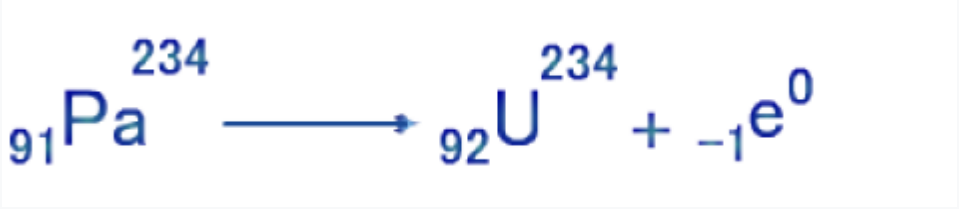
The first steps in this series include the conversion of the uranium isotope to the thorium isotope. By this degradation, the alpha minute is released. This nuclear reaction is represented as follows.

$$^{238}_{92}U \longrightarrow {}^{234}_{90}Th + {}^{4}_{2}He$$

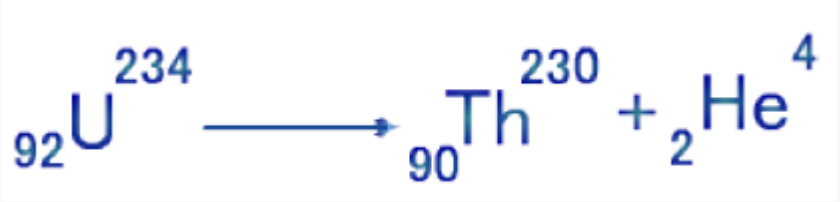
In the second step, thorium is converted to the protactinium analog of beta.



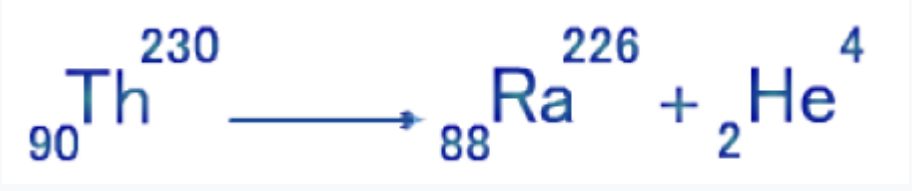
The third step converts the protactinium into the uranium isotope, again beta minutes, according to the formula:



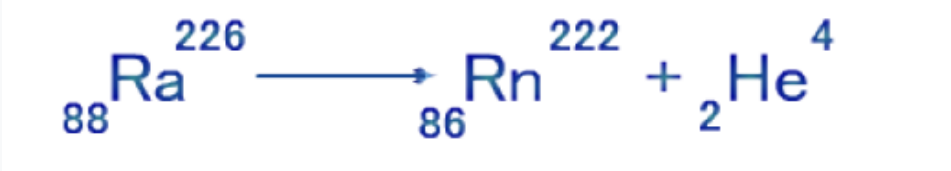
The fourth step represents the conversion of the uranium isotope to the thorium isotope. Thousand minutes are triggered by this transformation



. In the fifth step, thorium returns to the radium isotope, and alpha minutes are released



In the sixth step, radium is converted to the radon isotope



In the seventh step, radon turns into a polonium isotope

$$^{222}_{86}Rn \longrightarrow {}^{218}_{84}Po + {}^{4}_{2}He$$

Thus the series of transformations continues and produces an unstable isotope at each stage until uranium in its analyzes reaches the stable lead isotope in a series of 14 steps.

This type of series is called a **series of radioactivity**