Accelerated Radioactive Decay

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Radioactive decay rates are used by evolutionists to date various strata and fossils. These dates are then used to support the evolutionary scenario. From a reading of Genesis 1:1-2, we understand that humanity is about 6,000 years old. Indications are that the earth may be much older. The Biblical record does not agree with the various age scenarios as put forth by the evolutionists. Obviously, either the Bible is correct and the evolutionists are incorrect or the Bible is incorrect and the evolutionists are correct. Both cannot possibly be correct.

Figure 1. The earth according to the evolutionary scenario and modern dating methods is billions of years old. NASA photo

Evolutionary science has used the various dating methods to try to convince the nonscientific community that the Earth is probably billions of years old see figure 1. Mainly this is done is to give credence to the evolutionary theory. The evolutionary process requires minute changes in an organism's cellular and morphological structure. According to evolutionists these minute changes are compounded until eventually a new organism is produced. Vast amounts of time are also needed for these changes in the organism to occur. Therefore, these small changes in the organism through eons of time allow evolution to proceed. Without the vast amounts of time, numbering in the million and billions of years provided by the various dating methods, evolution could not occur.

One of the sacred pillars of radiometric dating methods is the constancy of the radioactive decay process.

> Support for the constancy of radioactive change comes from both nuclear theory and experiment. In the laboratory, for example, it is impossible to alter the rate of the radioactive decay by any combination of pressure and temperature known to exist within the Earth's crust. The same is true with respect to gravitational, magnetic, and electrical fields as well as the chemical state in which a given radioactive element is found. In short, the process of radioactive decay is immutable under all conditions significant to geology and archaeology (1).

Another quote in a leading university textbook on the subject of geology states the following:

> Why is radiometric dating realistic? It is because the rates of decay for many isotopes have been precisely measured and they do not vary, at least under the physical conditions that exist in the outer layers of Earth (2).

New scientific evidence has recently shown that the decay rate constants of many isotopes can be varied. This change in the decay rate constant requires some special conditions but there are no alterations of any known physical laws.

Neutrons, which are particles in the nucleus of an atom, are actually made up of an electron and a proton bonded together. The proton has a positive charge and the electron has a negative charge. Since opposite charges attract, the proton and the electron bond together, their charges cancel out and a neutron, which has no charge, is formed. An electron is also called a beta particle and is written as β^-, the negative sign denotes that it carries a negative charge.

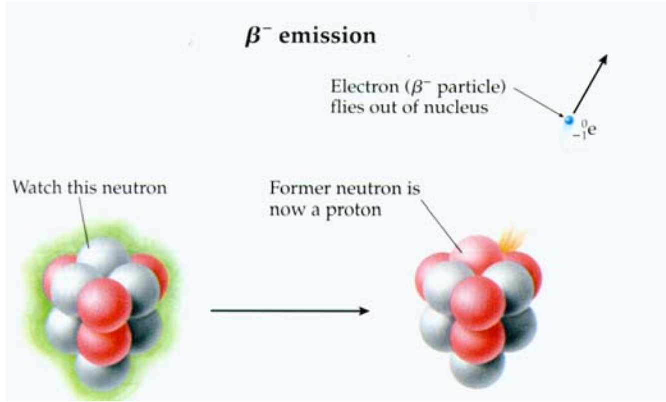

Figure 2. Showing the process of β^- decay. In the figure the neutron become a proton with the emission of an electron. The parent isotope is on the left the daughter isotope is on the right.

During beta decay a β^- particle (an electron) is emitted see figure 2 (3). The neutron which gave up the negatively charge electron is converted into a proton. The nucleus of the atom has now been rearranged. It has one less neutron and one more proton. This new element's atomic number has been increased by one although its mass has remained unchanged. Also, it has changed its nuclear structure and has been converted into another element. In radioisotope terminology the former element is the parent element and the new element is the daughter element.

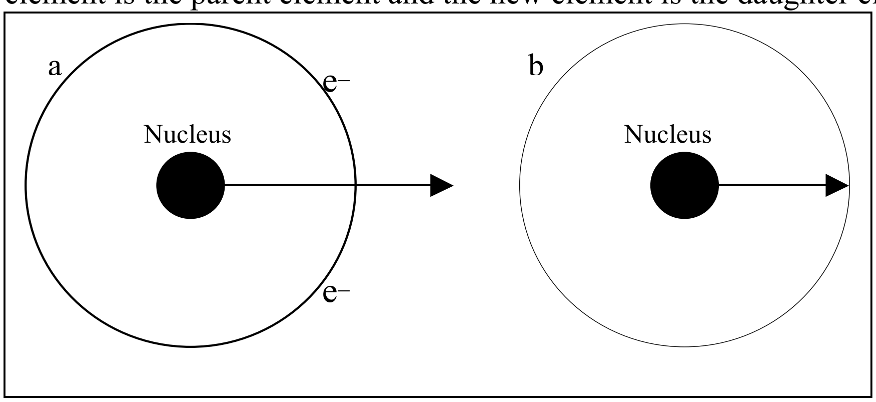

Figure 3. (a) Atom showing the 1s electron shell full. (b) Atom showing the 1s electron shell stripped of its electrons (e^-). This would occur in an ionized condition. The energy required for a beta particle, as represented by the arrow, to go to an empty shell is less than the energy required to escape into the continuum. Ionized atom b would have a very short $t_{1/2}$.

Since most atomic nuclei have a strong force attracting the electron (β^- particle), beta decay occurs very infrequently and therefore the half-life ($t_{1/2}$) of isotopes that undergo beta decay are generally very long.

In the beta decay half-life scenario it is understood that electrons surround the nucleus. During beta decay, the escaping electron would have to jump into the continuum of space since there would be no empty orbitals surrounding the nucleus of the atom see figure 3. If the orbitals had some empty spaces the emitted electron would still need a great deal of kinetic energy to escape the nucleus since it would take up residence in an empty shell surrounding the nucleus. The shells in an atom are filled beginning with the lowest energy shells, as more shells are filled more energy is needed to fill subsequent shell spaces. But what would happen if an atom was ionized and had no shells filled with electrons?

Theoretically an atom with empty or nonexistent electron shells would be able to emit beta particles more easily, because the emitted beta particles would fill up the empty shells. For the beta particle, filling empty shells requires less kinetic energy then jumping past filled shells into empty space. This type of beta decay is called bound-state beta decay (β_b decay). This would have a profound effect on the half-life of the isotope. Many laboratory scientists believe that the $t_{1/2}$ would change if electrons did not surround an atom, but until recently this was all theoretical. Theoretical analysis (4) indicated that this type of decay could affect the decay rates of 25 isotopes. Recent laboratory experiments have shown that this is no longer theoretical. Atoms with no electrons are able to undergo beta emission quite easily.

Plasma State Conditions

There are three common states of matter. They are; gas, solid, and liquid. Many scientists consider the plasma state the fourth state of matter. Plasma can be produced in a laboratory when a gas is heated to such a high state that the atoms vigorously collide. The force of these collisions causes the atoms to disassociate into ions and electrons. A plasma state occurs at high temperatures when there is a mixture of negatively charged electrons, positively charged ions, and atoms and molecules or both. In the plasma state there is a balance between the negative and positive forces of the particles in any give volume. In other words, atoms in a plasma state have no electrons surrounding the nucleus.

The vast majority of matter in the universe exists in a plasma state. Common forms of plasma include matter in the sun, stars, and interstellar space. Auroras, lightning, and welding arcs are all common plasma states. Plasmas also exist in neon and fluorescent tubes and in the crystalline structure of some metallic solids. High temperatures in the sun and the interior of the earth's core produce plasmas.

> At sufficiently high temperature, the atoms are stripped of all electrons and are bare atomic nuclei, and at temperature of about 1,000,000 K or greater, nuclear reactions can occur.
>
> Because the atoms of such alkalies as potassium, sodium, and cesium possess low ionization energies, plasmas may be produced from these by the direct application of heat at temperatures around 3,000 K. In most gases, however, before any significant degree of ionization is achieved, temperatures in the neighborhood of 10,000 K are required (5).

Atoms in a plasma state, in which the electrons have been stripped away due to high temperatures, would undergo accelerated decay rates. This accelerated decay rate would speed up the half-life of the various isotopes used in the different dating schemes devised by the evolutionists.

Experimental Demonstration

Experimental evidence for what was once theoretical evidence of accelerated beta decay was not produced until the 1990's. The following isotopes showed experimental evidence for accelerated beta decay rates:

- ^{163} Dysprosium under ionized plasma like conditions was found to decay into ^{163}Holmium with a $t_{1/2}$ of 47 days (6). Normally ^{163}Dy is a stable atom, which does not radioactively decay!
- In the ^{187}Rhenuim—^{187}Osmium system β_b decay was found to occur. In this experiment, fully ionized ^{187}Re was found to decay in an amazing measurable rate of 33 years (7, 8)! The conventional half-life of rhenium is 43 billion years. The ^{187}Re—^{187}Os system is one of the commonly used radioactive processes used to date rocks (9).
- The Lutetium-Hafnium system (^{176}Lu—^{176}Hf) is a newer system used by scientists to date rocks. In this system at very high temperatures (200-600 MK) part of the lutetium goes into a fast decay mode and shows a $t_{1/2}$ of between 3.68 hours and 8 days (10, 11). The normal $t_{1/2}$ of lutetium is about 40 billion years!

Implications For Creation

During the creation of the heavens in Genesis 1:1, if the elements were created in plasma like conditions many of the decay rates would have been accelerated. Also during the re-creation week mentioned after Genesis 1:2, God may have recreated elements in a plasma like condition. During the flood of Noah, undoubtedly there were large outpourings of magma and super heated material that flowed from the core of the earth. The surface of the earth would have been ripped and torn in pieces. The magma would be highly ionized and in a plasma like condition. Later this liquid rock would harden into the various metamorphic and igneous rocks that cover the surface of the earth. The rocks exposed by this activity would have appeared older due to accelerated β_b decay.

Many of the young earth creationists, who believe that all matter was created a few thousand years ago, try to place all of this accelerated decay, due to plasma like conditions, into a few hours during the first day of the creation week (12). When Genesis 1:1-2 is properly understood these accelerated process could have had many years in which to act. The minerals and rocks that had undergone accelerated β_b decay would have been incorporated into all matter in the created universe. God then used this matter in the pre-Adamic world and the post-Adamic world as building blocks for all things that exist.

The most important thing to consider is that the decay rates are not immutable. These processes can be accelerated. If decay rates can be accelerated then the question of the validity of the ages put forth by evolutionists becomes suspect.

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