The Comparative Abundance Of The Elements Essay, Research Paper

The Comparative Abundance of The Elements

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- There are 92 naturally occurring elements, only 17 of them make up 99.5% of

the earth’s crust (including oceans and atmosphere). – In living things (plants,

animals, people) the six most abundant elements are carbon, hydrogen, oxygen,

nitrogen, phosphorus and sulfur. – The universe is dominated by the elements

hydrogen (83%) and helium (16%)

1. The Crust

The outside of the earth is a thin crust which is approximately 20 to 40km

thick. The crust is a formation of dips and hollows which are filled with water

to form the oceans and seas. On top of the earth’s crust is an atmosphere, this

is a thin layer of gases, 95% of these gases are within the first 20km of the

earth’s surface. Of the 17 elements that make up 99.5%, the most abundant of

these are Oxygen 49.2%, Silicon 25%, and Aluminum 7.5%. Then the next most

abundant elements are Iron 4.7%, Calcium 3.4%, Sodium 2.6%, Potassium 2.4%,

Magnesium 1.9%, Hydrogen 0.9%, titanium 0.6%, Chlorine 0.2%, Phosphorus

Manganese and Carbon are all 0.1%, Sulfur 0.05% Barium 0.04%, Nitrogen 0.03% and

the rest of the elements on the periodic table take up about 0.5%.

The elements of the crust are graphed below, but only ones that are the

most abundant due to the fact that the abundance of the other elements of the

crust are too low to graph accurately on one graph.

Almost all elements are found as compounds, however Oxygen, Nitrogen,

and to a lesser extent sulfur, gold, silver and platinum are the only elements

which can be found in almost there raw sate. The atmosphere contains Oxygen and

nitrogen, but it only contains a small portion of the earth’s oxygen, this is

because most of the world’s oxygen is found in water, oxides of metals, and as

silicates. Common soils and clays are silicates.

2. Living Things

In living things (plants, animals, people) the six most abundant elements

are carbon, hydrogen, oxygen, nitrogen, phosphorus and sulfur (known as CHONPS).

Most compounds in living matter are radically complex, each molecule could

contain hundreds or thousand’s of atoms. Carbohydrates and fats are compounds

which contain carbon, hydrogen and oxygen only. Proteins are also compounds and

they contain nitrogen, sulfur and occasionally phosphorus. Living matter cannot

live on these six elements alone; even though they make up 99% of the mass, they

also need some compounds of other elements such as calcium, potassium, sodium,

magnesium, iron, zinc, fluorine and others. These elements are required as

compounds so that livings things can use them.

3. The Universe

The universe is dominated by the elements hydrogen 83%, and helium 16%.

Other elements in the universe are oxygen 0.1%, carbon 0.03%, nitrogen 0.01%,

silicon magnesium and neon are all about 0.003% of the elements in the universe.

The abundance of hydrogen and helium in this cosmic distribution of the elements,

proves all the elements were formed by nuclear fusion in the stars, for example

the Sun. Hydrogen is a basic material for which the other elements are gradually

built.