Stellar Metamorphosis: Carbon

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Abstract: All stars contain carbon and it is the main building block for all life in the universe. In the general theory, the carbon of a star combines with hydrogen, oxygen and nitrogen (as well as many others) in various combinations during its evolution, forming all biological molecules. This of course takes billions of years (alongside the evolution of life itself, which happens later on) and the carbon molecules increase in complexity as the stars' interiors evolve. For this paper some new ideas that have never been considered before are presented using the general theory.

Carbon composes all life. It is also the fourth most abundant element in the universe by mass. One doesn't have to go too far to reason how much life exists in the universe. That aside, the total estimated mass of carbon in the Sun is about 957 Earth masses. That is a lot of carbon to work with to form life. Another wild statistic is that the number of carbon compounds described to date is about 10 million, more than any other element. It is extremely versatile due to its unique properties such as an electronegativity of 2.5 on the Pauling scale. As well it has only 4 valence electrons, meaning to satisfy the shell of 8 it can combine with a wide range of other elements. Long polymers are formed naturally in stars as they evolve and cool, such as hydrocarbons (hydrogen-carbon chains).

The basics for understanding how a star forms life, is to reason that the carbon required to form it exists in huge quantities in young stars, as do all other elements required to form life. The previous statement that young stars like the Sun contain 957 Earth masses of carbon is not a high estimate. It is simply the Sun's mass of 330,000 times that of the Earth multiplied by its photospheric composition by mass for carbon, which is .29%. Though, young stars do not keep most of their carbon, they shed it off in solar wind, flare events and atmospheric escape. So as the stars age and transform into cooler, smaller stars, their carbon content (not just in the photosphere) will lower significantly.

As stars shed off their carbon a large percentage of it has already combined into molecules such as CO (carbon monoxide), CS (carbon monosulfide), CN (cyanogen radical), CH (methylidyne radical), C2 (diatomic carbon), C2O (dicarbon monoxide), CO2 (carbon dioxide), etc. That by itself answers the question as to why do those compounds exist in space? Stars make them and shed them off as they evolve. There is a lot of room out there to place unwanted molecules that the star could not trap with its gravity as it evolves and forms every naturally occurring molecule and compound in the universe.

It is important to understand that stars do not keep all their elements in the same proportion as they evolve, this includes carbon. Most of the Sun's hydrogen and helium will escape, unless it combines with other elements or mixes well. The closest exception to the rule is lithium.

Lithium paper is here:

http://vixra.org/pdf/1609.0304v1.pdf

The carbon measured on the Earth has been combined with hydrogen earlier in the Earth's history as amino acids were forming, and the Earth was much more massive and hotter. In short, the Sun has everything it needs to form life, given it cools and evolves on a slow enough time frame. It is suggested to study carbon compound formation during stellar evolution, as a few things will happen:

1. Carbon to hydrogen content will flip-flop for stars as they age, the youngest stars will have the most hydrogen, but eventually the carbon will match the hydrogen in mass, and then surpass the hydrogen in mass. This threshold probably happens shortly after ocean world stages of stellar evolution, as the hydrogen escapes via water evaporation (hydrogen and oxygen compose water).

2. When those elements flip flop in mass abundance is not known currently, but probably happens after the iron flip-flops. So the iron flip flops first because that is what the core forms from and is needed to begin the structure formation, and the other lighter elements battle it out afterwards.

The papers discussing that phenomenon here in the solar abundance principle:

http://vixra.org/pdf/1603.0422v1.pdf

and in the elemental mass equilibrium paper discussing when iron flip flops in stars here:

http://vixra.org/pdf/1811.0047v1.pdf

Basically the oldest stars have a higher percentage of iron by mass than hydrogen, and the youngest have much higher percentage of hydrogen by mass than iron (even alongside the fact that hydrogen is ~55 times lighter in atomic mass).

This paper will be expanded considerably in the future. There are more elements to address with regards to stellar evolution in the general theory.