

Electrochemistry, Thermochemistry and Thermodynamics in Star Evolution

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Abstract: It is provided for the reader a simple guide for determining if a stellar evolution (planet formation) model represents reality or ignores it. Explanation is provided outlining the three fundamental studies have been ignored in astronomy, astrophysics and geophysics.

According to the general theory of stellar metamorphosis the process of stellar evolution is the process of planet formation itself. The star is the new planet and the planet is the ancient star. This is fundamental to make any progress in astronomy, astrophysics and geophysics. Since the discovery was made that Earth is an evolved star, three types of fundamental understandings have been brought to the author's attention: electrochemistry, thermochemistry and thermodynamics. No new understandings are required to explain star evolution in these terms as of yet.

In electrochemistry a star needs an electrically conducting fluid and elements that are charged. Plasma conducts electricity and is charged as well as contains many dozens of different elements. In thermochemistry a star needs to conduct heat via conduction, convection and radiation as a result of chemical combination and decomposition (synthesis) reactions, which are both endothermic (heat absorbing) and exothermic (heat releasing) reactions. Stars have many hundreds of naturally occurring molecular compounds such as methane, water, and oxygen gas and radiate/conduct/convect massive amounts of heat energy, such as the Sun, Jupiter, Neptune, Earth, Uranus and Saturn. In thermodynamics a star needs to obey all four laws of thermodynamics.

- I. Zeroth law of thermodynamics – If two thermodynamic systems are each in thermal equilibrium with a third, then they are in thermal equilibrium with each other.
- II. First law of thermodynamics – Energy can neither be created nor destroyed. It can only change forms. In any process, the total energy of the universe remains the same. For a thermodynamic cycle the net heat supplied to the system equals the net work done by the system.
- III. Second law of thermodynamics – The entropy of an isolated system not in equilibrium will tend to increase over time, approaching a maximum value at equilibrium.
- IV. Third law of thermodynamics – As temperature approaches absolute zero, the entropy of a system approaches a constant minimum.

If any model of star evolution (planet formation) ignores or misapplies any law of thermodynamics, or does not include electrochemistry or thermochemistry in its prediction for eventual structure and processes, then it is not complete. If any model of star evolution (planet formation) states that thermochemistry/electrochemistry does not apply then it is ignoring reality and can be discarded without consequence to the development of humanities' sciences. The general theory of stellar metamorphosis relies on basic fundamentals that have been ignored because of the misdirection of nuclear age scientists into thinking stars were fusion reactors. They are not giant fusion reactors they are vast electrochemical and thermochemical events which obey basic thermodynamic principles. They are not isolated systems either, they will cool and die combining their elements into molecules and eventually form life as a direct result of their evolution.

It is suggested to the reader to use this basic understanding to debunk the now accepted models of star evolution which have been misdirecting our stellar sciences towards a dead end.