

## THE CHEMISTRY OF GLOBAL WARNING

The **law of conservation of mass/matter**, also known as **law of mass/matter conservation** says that the mass of a closed system will remain constant, regardless of the processes acting inside the system. A similar statement is that mass cannot be created/destroyed, although it may be rearranged in space, and changed into different types of particles. This implies that for any chemical process in a closed system, the mass of the reactants must equal the mass of the products. . WIKIPEDIA

There are three elements to consider here Hydrogen, Carbon and Oxygen. There is as much of each of these as there ever was but they are combined differently and to this end we must look at where they are now. There are also three compounds to consider – Hydrocarbons, water and carbon dioxide. Essentially they will be found

Hydrogen, in water and fossils (coal & petroleum). But also in the atmosphere in molecular form,

Carbon - in Carbon Dioxide- in the atmosphere and dissolved in the seas and oceans. Will also be found in carbonates such as chalk & limestone. Some molecular material – graphite.

Oxygen - In the air in molecular form and combined with hydrogen as water. It has no significance in the hydrocarbons.

Oxygen is also found in carbonates. The carbonates are dissolved from limestone in the land, assisted by the carbon dioxide in the air and are find their way into the sea. That is how we have the great caves in limestone. The Carbon dioxide does not enter into a chemical change it just acidifies the water and so helps dissolve the carbonates. Carbonates are only moving around and so do not enter into the current equation. So consideration must be given to silicates found in diatomaceous earth deposits but these must be natural recycling. Both the silicates and carbonates are being used by marine life but on a recyclable basis. Animal takes them from water and deposits them as shells or skeletons some where else.

In the normal (whatever that may be) scheme of things the carbon cycle goes on.

**ANIMAL LIFE = O<sub>2</sub> IN → CO<sub>2</sub> OUT**



**PLANT LIFE = CO<sub>2</sub> IN O<sub>2</sub> OUT**



Animals combine the oxygen with other elements from their diet to form complex organic compounds while plants are able to combine the carbon from the air to form complex organic compounds. Eventually both animal and plant life will after death recycle and after some complex reactions will so eventually return to CO<sub>2</sub>.

So where did all the carbon currently locked up in coal, gas and oil deposits come from? It has been shown that oil deposits came from marine life while coal deposits came from vegetable matter. So all this carbon and the hydrogen attached to it were tucked away and the oxygen released. The sea creatures and the plants must have been taking in CO<sub>2</sub> and water to get the hydrogen and giving out oxygen and we would have the reverse of what we have today - global cooling! The dying vegetation did not decompose but just collected and in vast quantities. Maybe bacteria had not been invented or the atmosphere was such that conditions were not conducive to decay, as we now know it.

Carbon Dioxide is soluble in water and so will reach equilibrium with the seawater where it is essential for the plant growth which feeds the “animal” growth in the sea.

It is also interesting to note that we have vast deposits of chalk and diatomaceous earth in some parts of the world. These have been shown to have come from small creatures but they are siliceous or calcitic – we cannot count the carbon in the carbonate as it is recycled from the sea water and not derived from the air. These, however, contain no hydrocarbon residues so all of the organic material must have been converted back to CO<sub>2</sub> and water. The sea creatures responsible for petroleum must have been invertebrates, as I have never heard of any skeleton or inorganic material in association with oil or gas.

The chemistry therefore suggests that the atmosphere at the time of the generation of the hydrocarbons must have been very high in CO<sub>2</sub> and moisture and so we can assume also that the climate must have been very hot and damp to provide an ambient to generate hydrocarbons faster than they could be recycled. I doubt if mankind or any of the animals we now have around could have survived. I am told that some greenhouse farmers speed up culture by putting some of the CO<sub>2</sub> (and moisture!) from their heaters back into the greenhouse. In this way they are moving conditions back to that time when the original vegetable matter must have been piling up in a CO<sub>2</sub> and moisture rich environment at high ambient temperatures.

It is reasonable to conclude that as the CO<sub>2</sub> was depleted by the production of the plants and animals the earth must have suffered from global cooling – the reverse of what we are doing.

In order for the coal and oil to get from where it was then to where it is now must be due to tremendous geological upheavals and volcanic activity and it is and any life forms we have now would be likely to survive in such conditions. However as Darwin established life adapted and changed to suit the actual conditions and the fittest (most adaptable) were the beginning of what we have now. So when the wild-lifers point out that all sorts of species are disappearing it is just the way the world has been going on since the year dot.

So what does this mean? Applying chemical principles so long as we continue to remove the carbon deposits from where they have been for millions of years and convert them into CO<sub>2</sub> and water – remember the equation  $C_xH_y + O_2 \rightarrow CO_2 + H_2O$  ie Coal or petrol burns to produce heat and in doing so produces Carbon Dioxide and water. Maybe the rising sea levels are not only due to melting ice! If we could get all our energy from renewable sources we could re-establish a balance and get the carbon cycle to work for us. I do not know if it is appreciated that it takes solar energy to make plants grow then we are using solar energy when we use cultured fuels rather than fossil fuels.

This is a spot where we need to bring in a bit of physics - The law of conservation of energy. This is another case of what goes up must come down. In the life span of the original animals and plants they soaked up heat from the sun in order to convert the carbon dioxide and water into the hydrocarbons which make up the present fossil fuels. When we use these fossils we release that heat again and so we get a double whammy as the carbon dioxide also stops heat loss into space and so also contributes to global warming.

Perhaps there is a good argument here to use atomic energy but how much fossil fuel does it take to get it working and that argument needs to be followed for every project. Freewheeling down a hill is not to ones advantage if you have to use a lot of energy to get to the top of the hill first.

The fossil fuel needed to produce steel and concrete must be considerable and so a greater use of cultivated timber for construction would be another way of locking up carbon. As timber has a long lifespan when properly cared for the use of timber for construction provides an excellent way of taking carbon out of the cycle.

So what of the future? Life forms will adapt and evolve as they always have. Some species will become extinct. Our descendants will bid farewell to Venice some pacific islands along with some coastal cities and low lying places.

It would be to everyone's advantage if we could stop the use of fossil fuels and it becomes not so much a question of can we afford to phase them out but rather can we afford not to? Whatever other arguments there may be the chemistry tells me that we are doing the wrong thing in converting the fossil fuels back into carbon dioxide and water. By putting the carbon and hydrogen into fossil form nature produced the environment we have today do we really want to go backwards in time. The products of combustion, and I haven't mentioned acid rain, are effluent and no life form can continue to exist in its own effluent. This is what a Red Tide amounts to. The fossil fuels are the effluent from many years ago and the remnants of now non-existent life forms.

I keep hearing of attempts to lock up the carbon dioxide by pumping it into underground storage and the people doing this seem to generally admit that it is a short-term strategy. To me it does not make sense as it probably takes more energy to push it into the ground (derived from fossil sources), means we are going around in circles. Shoving a gas into a geothermally heated zone does not make a lot of sense to me. Perhaps they should consider converting it to the solid form and dumping it in the arctic permafrost areas. Most beer drinkers will ware that when dry ice is put into water it encapsulates itself in ice and so the evaporation is slowed down. I believe that one of the best ways by far would be to kill two birds with one stone and fuse all scrap plastic into masses which could be safely placed out of harms way. Full marks should be given to one local enterprise which converts scrap paper and plastic into man made timber form which is much more durable than the natural products. Perhaps this could be expanded to make "plasticrete" and "plastibricks" by fusing sand together with unrecyclable plastic waste. Blocks and bricks made of this would reduce the need to make cement and clay bricks which uses fossils for energy. The foundry industry has been doing something similar for year for making moulds. I understand that dumping used tires into the sea at strategic points can create excellent artificial reefs. Fusing unusable waste into something that wont float would lock it up more safely and this would be better than having it floating about in the middle of the ocean.

There is nothing wrong with converting fossil "fuels" to plastics or other chemicals – just do not burn them.

And while the arguments go on we still are producing CO<sub>2</sub> – other energy sources are a must!