

Facts, Not Fiction, Of the Sources of Global Warming

Acid Rain

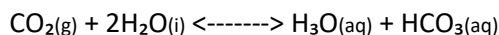
Introduction

We have been inundated with the likes of Greta. We have heard from climate activists from all over. We have heard from those that claim to be scientists whose credentials have not been proven. We have heard from governments and politicians. All these individuals have been showing us the results of global warming, but not many have given us the data from long term monitoring and testing. Those that have, have not released all of the data, and some have given us actual data that no one wants to talk about. This article is about facts, hopefully written for dummies, like many books are, such as PC's for Dummies or Woodworking for Dummies etc. This article is only a smidgen of what is really happening in our world, but is very much a big part of the problem.

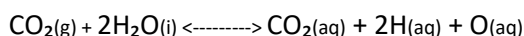
I am not a scientist; however I am a student of chemistry, a student of Geology, and a Mineral Prospector. I just want the reader to consider the facts; not the fiction behind global warming. The geological time line for our Earth has given rise to the discovery that in the past our planet had a CO₂ concentration within our atmosphere that was 2.5 times more than it is today and that there was a subtropical climate in the northern hemisphere.

Acid Rain

Carbon Dioxide, commonly known as CO₂, is a common gas found in our natural atmosphere and environment. You will find it not only in our air, but in our soil, and in our rocks. As it rains some of the atmospheric CO₂ becomes dissolved and becomes slightly acidic. For those of you who have studied chemistry in high school would be familiar with the pH scale. For those of you whom are not familiar with the scale of zero to fourteen, it represents the acidity or alkalinity of a substance. For gardeners you would be familiar with the term alkaline with a pH of maybe 9. On this scale the pH of 7 represents a neutral state. Getting back to rain; the normal pH value of natural occurring rain is about 5.6 which makes it slightly acidic in nature. In chemistry, using chemistry jargon, the reaction looks something like this:

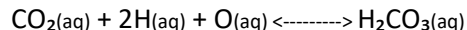


What this means is that carbon dioxide mixes with water giving us a mixture of Hydrogen Carbonate and Hydroxide in solution. However that is not the end of this simple reaction. As it continues to rain the substances in the water solution also further reacts with water to give us these reactions:



What this is referring to is the CO₂ gas is mixing with the water and as it does so it separates into distinct species of Carbon Dioxide, Hydrogen, and Oxygen, all floating around in the same solution of water.

These distinct species will also react with one another as shown:

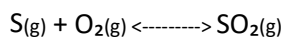


This refers to the Carbon Dioxide, Hydrogen, and Oxygen all coming together to form **Carbonic Acid**. Some of which will be in solution and falling to Earth in the form of acid rain. However it will be a weak form as the remaining will remain as a mixture of Hydroxide and Hydrogen Carbonate. In conclusion, any amount of rain that has a measured pH value that is less than 5.6 is classified as acid rain.

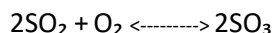
The above is factual and is what naturally occurring rain and thus natural rain is slightly acidic as it has a pH value which is less than 5.6; and thus any rain which measures less than 5.6 on the pH scale is therefore considered to be acid rain.

Sources of Acidity

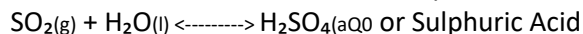
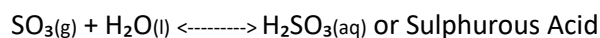
Almost every type of fuel, which includes the fossil fuels (coal and oil), are mixtures of different Hydrocarbons. If you have been a chemistry 11 student you would be familiar with CH Chains. Some of these fossil fuels such as fossil derived diesel oil will contain sulphur. Any time that you burn a fuel that contains sulphur, the sulphur atoms will be liberated from the compound' and mix with the oxygen in the air to form a compound known as Sulphur Dioxide. To a chemist the reaction would be:



What this refers to is that the Sulphur gas will combine with the Oxygen to form Sulphur Dioxide. As more of the Sulphur Dioxide is produced it will also combine with additional Oxygen and more subsequent reactions. As these reactions continue we get:

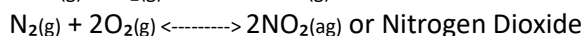


This refers to 2 Sulphur dioxide molecules combining with another Oxygen molecule to form 2 Sulphur Trioxide molecules. There is a problem. Dust and water will act as a catalyst which creates a faster reaction rate and these compounds form much more quickly. When these two gases (Sulphur Dioxide and Sulphur Trioxide) dissolve into water we get:



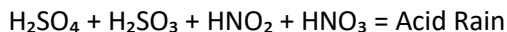
When these two acids are combined together the chemists call this cocktail SOX.

There is another reaction that takes place in your automobile engine. The result is small amounts of N₂ which is Nitrogen. When Nitrogen reacts with the Oxygen in the air we get:



Now consider the fact that we have water everywhere; some of which is in minute amounts, some in large amounts, and some in vapor form (clouds, mist, and steam). When these two molecules are dissolved in water we get HNO₂(aq) and HNO₃(aq). HNO₂(aq) is Nitrous Acid and HNO₃(aq) is Nitric Acid.

When these two acids are combined, the chemists call this cocktail NOX. By mixing all these chemicals together we get 1 proverbial soup mix called Acid Rain. Putting it another way:

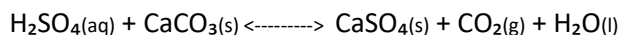


At this point I have to remind you, the reader, that we humans are not the only contributors of acid rain. Nature in itself plays a huge role. Decaying Bio matter (plants, animals, feces, natural forest fires, just to name a few) produces large amounts of Sulphur Dioxide. Then you have Mother Earth; volcanic eruptions, passive volcanic activity (steamers like Mount Baker), the vents from undersea trenches, sulphur springs, and so on will almost forever continue to add huge amounts of SO₂ into our environment worldwide. Just try stopping it. Weather plays a big part as well with all those lightning strikes producing large amounts of Nitric Oxide. Making a point that we are not the only cause.

Natures Protection

Almost every lake, our oceans included, has a moderate CO₂ / HCO₃ buffering capability or capacity for the lake to remain within the appropriate pH balance or equilibrium. The downside is that if this buffering capability is overwhelmed, the buffering capacity becomes exceeded and the ECO System starts to deteriorate.

If the Acid Rains is stopped, the absorption₂ of CO₂ will be slowed down to natures normal concentrations and the concentrations of NO, HCO₃, and SO₂ will eventually be lowered to safe concentrations if not reversed. Mother Earth herself contains large quantities of limestone (CaCO₃). This Earthly stone can and does neutralize Acid Rain. When a solution of Sulphuric Acid is added to limestone in the form of rain, the limestones through time does dissolve. The results are, a production of Calcium Sulphate(s), Carbon Dioxide(g) is liberated, and water. Nice; the acid rain becomes neutralized in time.



Actually not quite nice. Within time the natural Limestone will be used up. This creates caverns, sink holes, or just plain depleted. In areas where Limestone is not naturally occurring our governments take action. Using airplanes and helicopters, powdered Limestone will be dumped into a lake in order to neutralize the acidity to safe levels. This procedure reverses some of the effects caused by the Acid Rain as well as other natural occurring factors such as sulphur springs.

Enviro problems associated with Acid Rain

Acid rain acidifies our water and the soil. This seriously affects Fish and plant growth in the eco system. Many lakes today are now fish and plant less. Forests are adversely affected and start to die off. The underlying soil becomes too acidic to sustain vegetation. The devastation of sugar maples in Quebec, the Black Forest in Germany and some of the forests in the Scandinavian countries are all evidence of the detrimental effects of acid rain.

The acids in the acid rain solution leaches out the minerals that make up the natural rocks and soil in our earth. It would be irresponsible to mention that there is a natural process of leaching caused by the dissolving of minerals within the water table and erosion from snow packs as they melt. All of these processes just add to the problem. Toxic substances such as Aluminum ions (dissolved aluminum atoms suspended in the solution) are leached or dissolved out of the rocks and soil. There are others such as

barium from a rock known as Barite or Manganese; and there are many more which are listed in the periodic table. It is also worth noting that natural occurring beneficial nutrients are also leached out of the soils which tend to be drained further down into the lower soil levels where they become unavailable to the growing vegetation.

Acid Rain slowly eats away at metal and stone structures. Limestone facings on older architectures have been damaged if not completely destroyed. Stone statues have been slowly dissolved to a point where they are no longer recognizable. It is saddening for Archeologists and Historians. Acid Rain is a type of pollution that has no boundaries. It has the ability via weather process to fall far from its location of creation. On a limited scale, international agreements have been reached to reduce emissions; however, some nations have not even tried to clean up the pollution. The fact is that if the effects do not impact them directly they will not spend the money for the effort.

Clean up and new technology is expensive and the cost for converting to alternate fuels and energy can be enormous, and in some cases deadly; Chernobyl for one. Industries could actually close if they are financially incapable of complying with strict regulations and some already have. This becomes an economic burden as jobs are lost; both for business, government, and tax payers.

For government, it becomes political suicide if the common citizen does not see results or benefits from the green taxes that they are doling out. It becomes a drain on disposable income with no return on investment.

Health hazards are compounded by Acid Rain. It is bad enough having large concentrations of natural occurring Manganese in your ground water supply, just add some acid rain to the system and watch the contamination increase. It is not only a health hazard directly but also indirectly as it destroys crops like tomatoes, radishes, and apples, plus more. Food shortages arise and people starve..

Glitters of Hope and Mitigation

With the birth of social media, public awareness on environmental issues has increased. News releases and international conferences have been recorded and made available to anyone concerned. Conversations have been started and people are talking. But we do have the Gretta's of the world, not to mention the nay Sayers and a few good scientists publicizing their findings backed by facts. What has been brought into light is the number of agreements that have been signed regarding global warming and the aforementioned problems. You have guessed by now that this article started with CO₂ gas and how it reacts with our environment. Yes, a greenhouse gas. The concentrations today are not as high as they were a few million years ago when the northern hemisphere had a sub-tropical climate, but we are getting warmer. It is also interesting to note that there recently had a glacier disappear and the plaque that was put into place acknowledging global warming as a cause, did not include the geologist long time report of the ground temperature monitoring of that volcanic dome which should have been conducted by placing sensors at a reasonable depth below the base of that volcano and monitored for a considerable amount of time. The island that this occurred on has several live volcanoes and is on a plate that is still moving. Without proper monitoring, data collection over time, and good analysis, how can one fully determine if it is in reality, caused by global warming; or is the ground below getting warmer?

Abandoning the technology we have today is not a definitive answer. There is no way to be able to reverse some of the problems combined by nature and human beings. Technologies are evolving and

new technologies are emerging. Alternate sources of clean, nonpolluting renewable energy are being more widely adopted and used; but at a cost. Natural resources are now being more exploited. Mining for raw materials has increased. This fact is starting to put a strain on our natural physical environment thus causing changes to our eco-systems.

Production and refining of these natural raw materials in order to produce material and parts used for the creation and manufacturing for the devices used to produce the source material to create these new energy alternatives is putting a strain on power requirements and mother earth herself.

Consider a couple million electric automobiles, what will the future power requirements be to just charge the batteries? Now add to this power requirement the power needed to power our cities, communities and more. We just can't shut down the traffic lights, and I doubt if you want your street to go black because there is not enough of a grid supply of energy.

There are processes which have been modernized by new and emerging technologies. These processes and innovation have indeed reduced pollution, but it only made a dent in the graph. Not every nation can afford these new technologies nor do they have the resources to implement the change. Although the reduction of pollution and toxic waste along with more and improved recycling processes are proving to show results, it becomes and will become harder to recycle for example billions of spent batteries from electric automobiles, propeller blades from wind generators, which are not recyclable at this time, spent radioactive fuel rods, and more.

Only our scientists, technologists, engineers and designers can find a way through research and development. But this can only happen if 100% of these projects are funded by the so called green and carbon taxes that our governments are collecting. The taxes must be funneled to the research centers and scientists; **not to government coffers and private hands.**

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