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Global Warming Could Be Reversed

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Abstract

As our demands for energy increase, our carbon emission accumulated year by year as we can only use fossil fuels to meet our energy demands for now, but this causes environmental problem, i.e., global warming and climate change. How much energy we need, how much emission we would make, can we both meet our energy demand while reaching the net-zero emission and even reverse the past emission we accumulated? Therefore, we need find carbon-based materials, which we can synthesize simply from carbon dioxide and solar power in the atmosphere, if we can produce our energy by synthesizing such materials in same rate as we consume fossil fuels today, then both energy crisis and climate change can be resolved at once. Ethanol is promising but not enough, that oxygen atom in each molecule needs be removed.

Keywords: Climate change, Energy, Carbon dioxide, Solar power, Carbon based

Introduction

The emission of carbon dioxide to the atmosphere is the major cause for global warming, which leads to climate change. There are also other greenhouse gases, such as methane and chlorofluorocarbon, methane should have stronger effect of global warming, but carbon dioxide is much more concentrated than methane, about 220 times than methane, carbon emission is still the major issue to solve for tackling global warming.

Currently to reduce the carbon emission is the major way to restrain global warming, UN has brought up carbon neutrality in its sustainable development goals, it aims to reach a net-zero carbon emission. However, in today's society, people need consume much energy and this is why we emit much carbon dioxide, we need consume so much fossil fuels to meet our demands for energy. Fossil fuels are solar power stored in the creatures by carbon fixation hundreds of millions of years ago, buried underground and they became oil, coal and natural gas etc.; therefore, when that carbon was released, the carbon content in the atmosphere rises rapidly, and as carbon reflect infrared light, the heat on the land will be trapped in the earth, this causes global warming.

We need consume energy, for which we may have to emit carbon, but we also must keep our environment habitable, healthy and no harm to creatures on it, therefore we must reduce carbon emission, reach net-zero emission goal. Could we emit more but also reverse more emission at the same time, so that the net emission is still zero or even negative, while we can use more energy? Fossil fuels are the solar power stored in the creatures hundreds of millions of years ago, and today this process is still continuing, green plants which has chloroplast continuously absorb solar energy, water and carbon dioxide in the atmosphere, to synthesize starch which stores solar energy, however this process is just too slow to balance the emission of our consumption of fossil fuels for using energy. Therefore, if we can make this process artificially, the rate of carbon fixation and energy producing is same as the rate of carbon emission and energy using, our net carbon emission could be zero while the energy we can use is not less. We consume fossil fuels every time, but we never fixed the carbon we emit in same rate as we consumed, in which process we can produce same amount of energy as we consumed. We use the energy stored underground hundreds of millions of years ago, together with carbon emission same stored for hundreds of years ago, therefore the carbon accumulates in the atmosphere year by year, and this leads to global warming, causes climate change.

However, if we can fix the carbon in the atmosphere in same rate as we emit, producing energy in same rate as we consume, such accumulation could be stopped, the carbon emission and fixation could be in an equilibrium, the net carbon emission could be zero from time to time, that reaches our goal, i.e., net-zero emission. And we could take more measurements to reverse the accumulated

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emission so far as the current net carbon emission is zero, thereby global warming could be reversed, so as climate change. Such process of carbon fixation must be the process we produce energy in the future, to store solar power, since all energy on the earth comes from the sun, the sun must be our final energy resource on the earth. Whether the earth core has nuclear reactor is unknown, anyway, the earth needs that energy to power the magnetic field to protect the creatures and humans on the earth, so we should seek energy from the sun not the earth core. To build artificial sun is still same as our natural sun, it can be applied to interstellar travel, but wastes our natural sun if we use it on the earth, and how can we use an artificial sun when we can't use our natural sun at first?

Think like this, we need carbon-based materials, we can synthesize them by absorbing carbon dioxide using solar power, since carbon dioxide is the major form of carbon emission and atmospheric carbon, then we can save solar power together with carbon fixation. And this material must have comparable volumetric and gravimetric energy density with gasoline and other fossil fuels in condensed states, so that we can use them easily like fossil fuels we are using. If we can produce them in same rate as we consume them for energy use, then the carbon emission could be net zero.

Among all carbon-based materials, which can be synthesized by carbon dioxide with solar energy, ethanol is promising in some extent. As each carbon in ethanol takes same amount of energy as that in gasoline, about $684KJ/mol$, and it also has less carbon emission when releasing same energy compared with gasoline, the carbon emission is about $64kg\ CO_2/GJ$ for ethanol and $73\ to\ 75kg\ CO_2/GJ$ for oil and gasoline. The density of ethanol is also similar to that of gasoline, but a defect of ethanol for replacing fossil fuels to be our energy currency is just its gravimetric energy density, only $2/3$ of gasoline, because it carries one more oxygen atom in each molecule, this oxygen atoms increases the mass of each molecule, but doesn't increase the chemical energy that each molecule carries. However, if we could find more advanced materials that can be synthesized in higher stages of ethanol, using solar power, to remove that oxygen atom in the ethanol molecule, then such materials, which we can synthesize directly from atmospheric carbon and solar power finally, could perfectly replace fossil fuels to be our new energy currencies, then both energy crisis and climate change problems could be resolved in this way.[1-6]

If we produce our energy by synthesizing such materials in global scale, using the carbon dioxide and solar power in the atmosphere, in same rate as we consume fossil fuels for using energy today, this not only meets our energy demands, but also lowers the surrounding temperature, as it absorbs solar power and store them in our new energy currencies. In summer, we need use air conditioner to make our living environment habitable; however, air conditioner uses Carnot cycle to produce cooling, it can't decrease the heat globally, the cooling is only local, and in general case, more heat will be produced globally since there is always wasted work. Such energy producing using atmospheric carbon and solar power in the atmosphere can lower our environment temperature globally.

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Conflicts of Interest

Regarding the publication of this article, the author declares that he has no conflict of interest.

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