Innovations on CO2

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Abstract: **Carbon dioxide (chemical formula CO_2) is a naturally occurring chemical compound composed of two oxygen atoms eachcovalently double bonded to a single carbon atom. Concentration of carbon dioxide, the major cause of global warming, increased at their fastest rate for 30 years in2013, even though the world's scientists warned to cut emissions to stop temperature rises.This paper discusses the process of balancing thepercentage of CO2by sucking it from the Environment. And sucked CO2 then convertedto Dry Ice.**

Keywords- Global Warming, Dry Ice.

I. Introduction

Concentration of carbon dioxide in the atmosphere causes the climate change. Since the beginning of human civilization, or atmosphere contained about 275 ppm of carbon dioxide. That is the planet "on which civilization developed and to which life on earth is adopted." Beginning in the 18th century, humans began to burn coal, gas and oil to produce energy and goods. The amount of carbon in the atmosphere began to rise, at first slowly and now more quickly. Many of the activities we do everyday like turning the lights on, cooking foods, or heating our home relay on energy sources that emit carbon dioxide and other heat-trapping gases. We are taking millions of years worth of carbon, once stored beneath the earth as fossil fuels, and releasing it into the atmosphere.

Right now we're at 400 ppm, and we're adding 2 ppm of carbon dioxide to the atmosphere every year. Unless we are able to rapidly turn that around and return to below 350 ppm this century, we risk triggering tipping points and irreversible impacts that could send climate change spinning truly beyond our control.

We have one of the most common tasks for the balancing of CO2and it involves the conversion of CO2 to Dry Ice to remove the pollution caused by CO2

II. Discussion

The Arctic is sending us perhaps the clearest message that climate change is occurring much more rapidly than scientists had previously thought. In the summer of 2012, roughly half of the Arctic's sea ice went missing (some scientists estimate that the total volume of summer sea ice loss may be as high as 80%). The entire Arctic region is undergoing drastic changes, threatening vital habitat for countless species (yes, including polar bears) and the livelihoods of many indigenous communities. This is also bringing us closer to dangerous tipping points, like the breakdown of the Greenland ice sheet and major methane releases from quickening permafrost melt.

This is the science of climate change. While much of the details are still being studied, one thing is no longer up for debate: our climate is changing profoundly and rapidly, and human activity is the cause.

In a 2006 report, the U.N. Food and Agriculture Organization (FAO) concluded that worldwide livestock farming generates 18% of the planet's greenhouse gas emissions — by comparison, all the world's cars, trains, planes and boats account for a combined 13% of greenhouse gas emissions. Much of livestock's contribution to global warming come from deforestation.

III. Causes

Glaciers everywhere are melting and disappearing fast, threatening the primary source of clean water for millions of people. Mosquitoes, who like a warmer world, are spreading into lots of new places, and bringing malaria and dengue fever with them. Drought is becoming much more common, making food harder to grow in many places. Sea levels have begun to rise, and scientists warn that they could go up as much as several meters this century. If that happens, many of the world's cities, island nations, and farmland will be underwater. Meanwhile, the oceans are growing more acidic because of the CO_2 they are absorbing, which makes it harder for animals like corals and clams to build their shells and exoskeletons. All around the globe, we're stacking the deck for extreme weather — like hurricanes, typhoons, blizzards, and droughts — which exacerbates conflicts and security issues in regions that are already strapped for resources.

IV. Control

The technique of reducing carbon dioxide gas from the environment is sucking carbon dioxide gas from the atmosphere. One of the method is amines that are already used to capture concentrated carbon dioxide emitted from fossil-fuel power plants. This same amine-based technology, also showed potential for the far more difficult and ambitious task of capturing the gas from the open air, where carbon dioxide is found at

concentrations of 400 parts per million. That's up to 300 times more diffuse than in power plant smokestacks.

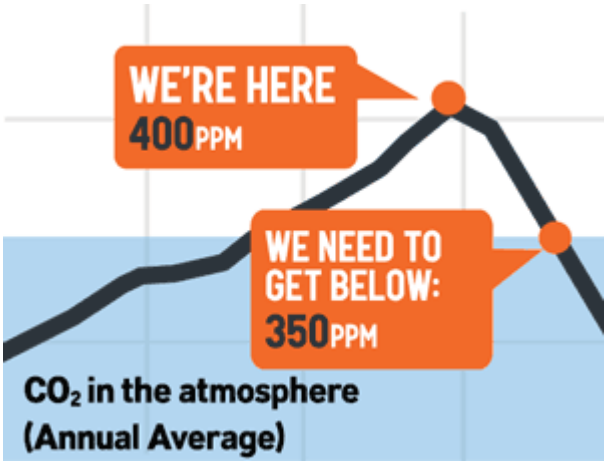


Fig. simplified version of climate crisis

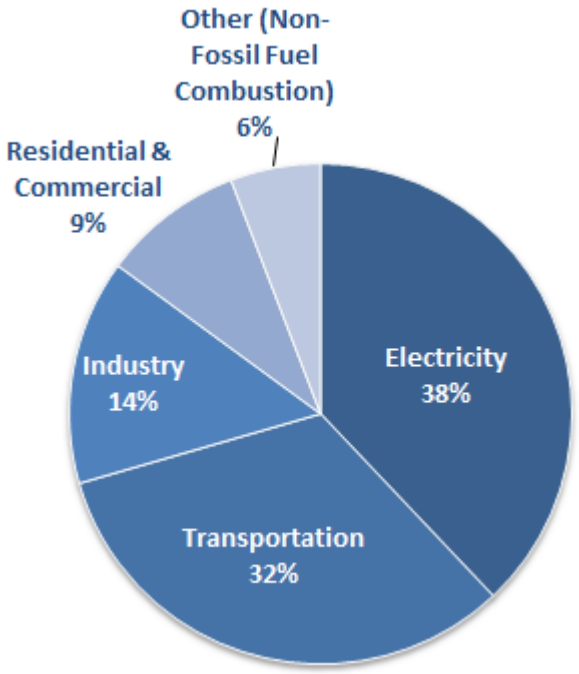


Fig. all emission estimates

V. SCIENTISTS VIEW

The new process was discovered by Alain Goeppert, G. K. Surya Prakash, and chemistry Nobel Laureate George A. Olah and others based at the Loker Hydrocarbon Research Institute and Department of Chemistry, University of Southern California. They were successful in using inexpensive materials to achieve some of the highest carbon dioxide removal rates ever reported for humid air, under conditions that stymie other related materials. The scientists were also able to remove the captured carbon dioxide easily for making other substances potentially isolating the carbon from the environment. The adsorbent material can then be recycled for repeated use in capturing carbon dioxide.

Material Used

"Easy to prepare solid materials based on fumed silica impregnated with polyethylenimine (PEI) were found to be superior adsorbents for the capture of carbon dioxide directly from air. During the initial hours of the experiments, these adsorbents effectively scrubbed all the CO2 from the air despite its very low concentration. The effect of moisture on the adsorption characteristics and capacity was studied at room temperature. Regenerative ability was also determined in a short series of adsorption/desorptin cycle."

Process

The scientists used a polymer called polyethylenimine (PEI) as the basis for adsorbing carbon dioxide. Adsorption occurrs when atoms stick to a material's surface, as against the absorption process where atoms permeate material. Nitrogen in the polymer forms a link to carbon when carbon dioxide is present. When the adsorbed material is heated to 100C, the link breaks releasing the carbon allowing for easy and relatively cheap way to collect and concentrate carbon dioxide.

The technology is a long way from commercialistion with much more research and then development required to make this a commercial industrial scale technology.

ALTERNATING FUEL: capturing carbon dioxide for renewable methanol

Methanol is relatively straightforward and cheap fuel to produce, easy to store and transport and is seen by some scientists as overcoming the large problems of using hydrogen as a widespread fuel for transportation. "Hydrogen gas is still difficult to store and distribute. It is for this reason we have targeted producing methanol, which is easy to use as a fuel." says Dinko Chakarov, professor of physics at Chalmers University of Technology in Sweden December 2011 media release. "Carbon dioxide currently comes from carbon dioxide separation during carbon combustion, for example," says Dinko Chakarov. "In the future, we hope it will be possible to condense carbon dioxide from the air, which would result in an entirely carbon dioxide neutral cycle."

Methanol or methyl alcohol is the simplest of all alcohols. It's chemical structure is CH3OH. It can be mixed with petrol or with some modification used alone in modern petrol engines or converted to biodiesel. It can also be used in fuel cells and be burned in existing power generation plants. Methanol can also be used as the raw ingredient for the plastics industry to replace petroleum.

VI. Our Views

An another method of reducing carbon dioxide from the atmosphere is to suck it and converted into dry ice which is then used for many purposes.

Dry Ice

PHYSICAL DESCRIPTION

Dry Ice is frozen carbon dioxide, a normal part of our earth's atmosphere. It is the gas that we exhale during breathing and the gas that plants use in photosynthesis. It is also the same gas added to water to make soda water. Dry Ice is particularly useful for freezing, and keeping things frozen because of its very cold temperature: -109.3°F or -78.5°C. Dry Ice is widely used because it is simple to freeze and easy to handle using insulated gloves. Dry Ice changes directly from a solid to a gas -sublimating - in normal atmospheric conditions without going through a wet liquid stage.

HOW DRY ICE IS MADE

The first step in making dry ice is to compress carbon dioxide gas until it liquefies, at the same time removing the excess heat. The C02gas will liquefy at a pressure of approximately 870 pounds per square inch at room temperature. Next, the pressure is reduced over the liquid carbon dioxide by sending it through an expansion valve into an empty chamber. The liquid will flash, with some turning into gas causing the remainder to cool. As the temperature drops to -109.3°F, the temperature of frozen CO2, some of it will freeze into snow. This dry ice snow is then compressed together under a large press to form blocks or extruded into various sized pellets. Dry Ice is much heavier than traditional ice, weighing about double.

ANOTHER PROPERTIES

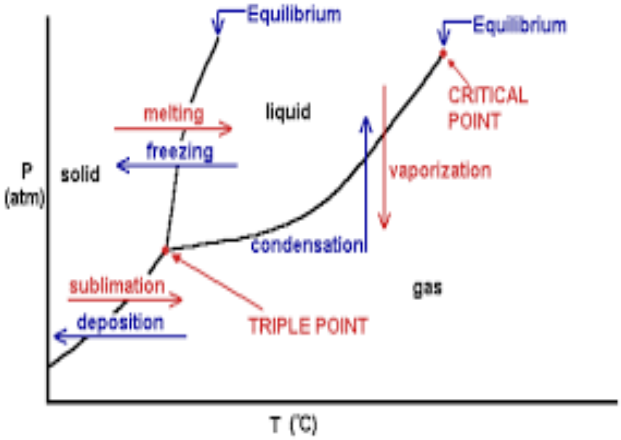
SUBLIMATION

Sublimation is the transition of a substance directly from the solid to the gas phase without passing through the intermediate liquid phase. Sublimation is an endothermic phase transition that occurs at temperatures and pressures below a substance's triple point in its phase diagram. The reverse process of sublimation is desublimation or deposition, in which a substance passes directly from a gas to a solid phase

DRY ICE MAKERS

Dry Ice machines are available in all sizes and use liquid CO2. Hand held ones make soft Dry Ice that dissipates quicker. Large commercial machines use hydraulic presses to compress the Dry Ice snow with up to 60 Tons of pressure. It can produce a 55 pound block in under 60 second

Fig. Small pellets of dry ice subliming in ai



P-T diagram for a substance as CO2

DRY ICE ENERGY CONCEPT

We want to make the world a cleaner place and thereby go easy on the environment.

WHY DRY ICE?

Other cleaning methods, for instance steam cleaning or high-pressure cleaning, whilst producing good results also incur increasingly high costs and pollute the environment - whereas with Dry Ice Energy products we can clean without water or chemicals!

In the sphere of modern commercial or industrial cleaning, dry ice blasting opens up a new dimension and is meeting with unprecedented triumphant success.

The technique is innovative, ecological and highly effective. These enormous advantages are the reason for Dry Ice Energy's great appeal. The compact, economical cleaning machines are ideal for use in a huge range of areas, from cleaning cars (inside and out) to use in the food production industry to their many uses as regards the low-cost cleaning of machinery and facilities. Not only do they save time and money, they are also kind to the environment, since no blasting agent residues remain behind, nor is there any need to use chemicals.

HOW DOES IT WORK?

During the cleaning process, the layer of dirt to be removed is instantaneously cooled down and embrittled by the dry ice pellets with a temperature of -79 degrees Celsius. Subsequent dry ice pellets penetrate into the cracks and blast dirt particles off the surface to be cleaned. The dry ice sublimates and, in so doing, increases its volume around 700- to 1000-fold. This accelerates the cleaning effect even more. Skilfully dosed, dry ice can even be used to remove dirt from very sensitive surfaces. The remaining dry dirt can be disposed of at once and with ease.

VII. Conclusion

- Goes easy on materials, as can be dosed individually and is not abrasive
- Neutralizes smells, is non-toxic and food-safe
- Low-consumption cleaning
- Non-conductive, as no water is used
- Absolutely eco-friendly. During cleaning, only that amount of CO2 is returned to the atmosphere that was previously drawn from it when the dry ice was made – so that the CO2 balance is neutral and ecologically sound.
- Residue-free – only the dirt remains behind, no mixture of water or chemicals and oil that is hard to dispose of. The blasting agent (dry ice) turns into gas and is returned to the atmosphere.
- The small, mobile Dry Ice Energy machines can be used practically anywhere, any time. The larger Dry Ice Energy blasting machines are already being used successfully for a number of purposes in the industrial sector.

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