

Carbon Emission Control for Industrial Application

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I propose a protocol for the filtration of carbon dioxide and other carbon based compounds, which are the central cause of greenhouse gases, from an emission. The protocol involves the addition of the carbon emission to a diffusion friendly gas (such as H₂O) at high temperature in vapour form. The combination of the two gases will allow a formation of a liquid/solid chemical mixture upon cooling. There are numerous possibilities of the final chemical state of the mixture. The final step of the protocol is to simply filter the liquid and solid chemicals from the water for safe disposal.

The Protocol

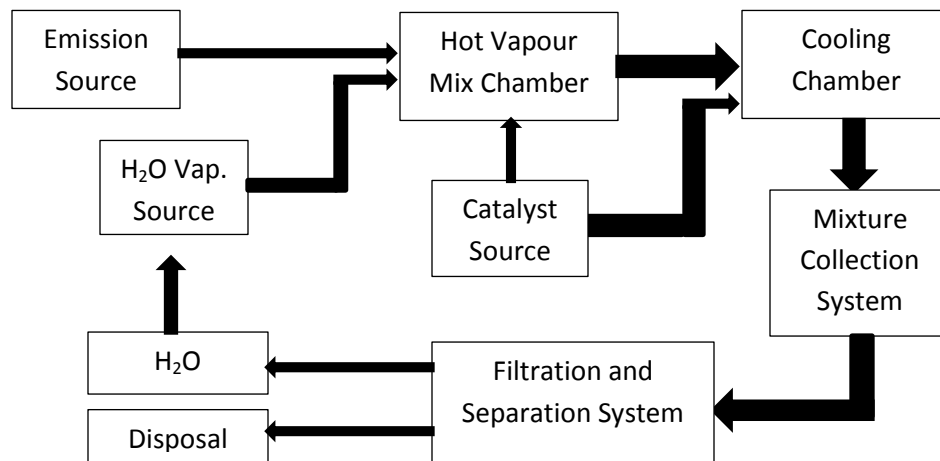
In the history of the engineering sciences related to industrial emissions there has yet to be created a wide spread and practical protocol for the filtration of deadly greenhouse gas emissions. I'm sure that the engineering community has considered the task of developing such a protocol, but the natural conclusion of this consideration would be to assume that it is an impractical or non-viable consideration. We can all think of a manner in which we would choose to completely filter an automobile emission, but we would usually arrive at a protocol where the energetic demands would outweigh the limitations of supply. It would likely be the case that our ideal filtration protocol would involve a device which is heavier and more energetically demanding than the automobile itself. With this in mind it is assumed that no protocol is possible where a much larger industrial emission, like the engine of a tractor trailer combination perhaps, could have such a practical protocol either. But is this short sighted? Could we indeed construct the most efficient form of protocol, and miniaturize the protocol to be within practical limitations so that is even viable for the smallest of engines with emission? It is proposed here that indeed such a protocol is possible.

One of the central compounds of deadly greenhouse gases emissions is carbon dioxide, CO₂. The favorable property of this and other similar emissions is that they are water soluble and they may readily diffuse into liquid H₂O. The reason this property is favorable is because it makes for an efficient and readily available method by which one may filter the CO₂ and other water diffusive or water soluble compounds from a given industrial emission, whether the emission is that of an automobile exhaust, a coal burning smokestack, or any other form of CO₂ or carbon based emission. The protocol that is presented here is illustrated in Figure 1 where we see the input at the top left of the diagram is an emission. This emission is assumed to consist of CO₂ or any other H₂O diffusive compound and other constituents that do not ruin the viability of the remainder of the protocol. The direction of the arrows in the illustration are intended to indicate the direction of movement of the emission and water vapour as they are directed by the applied pressure of a vapour driving mechanism.

The emission is added to a source of H₂O vapour (steam) in a vapour mixing chamber*. The emission in most industrial applications is already significantly heated, so we assume the emission to be hotter than room temperature. The water vapour that is added to the emission must also be significantly heated, so adding it to the emission source will not cause significant cooling to either. The hot vapour mix chamber is the stage of the protocol where we not only add the emission to the water vapour, but we also

prepare the temperature of the chamber so that the mixture is heated to the optimal temperature for the two to readily mix and for the preparation of the total mixture to achieve the desired chemical state upon cooling. What is meant by this is that the chamber must heat the mixed vapours to a specific temperature, and that this temperature is hot enough for the cooling phase to result in the desired chemical state. Also we intend to mean that the chamber is shaped such that the mechanical action taken on the vapours will ensure that the two inputs will have mixed sufficiently to achieve the desired chemical state upon cooling. This total process of mixing and heating might also require the addition of several chemical compounds that act as catalysts to the chemical reaction that produces the desired chemical state. This may require the input of the catalyst at the hot vapour mix chamber or at the cooling chamber.

Figure 1: A protocol for carbon emission control



Once the mixture has passed the hot vapour mix chamber it then enters a cooling chamber which cools the mixture to a desired temperature where it is optimal for the separation of the constituent compounds from the water. (It is assumed that the desired end temperature of the mixture will be less than 100°C and above 0°C so that the water is liquid.) After cooling the mixture is then forced into the mixture collection chamber. This chamber is ideally prepared for the efficient collection of the cooled mixture in its desired chemical state. This means that we would wish to have this chamber constructed such that the mechanical action on the mixture will collect the mixture and allow undesirable constituents (like air) to escape. Due to the cooling of the mixture in the previous stage, the mixture has dropped in temperature and is now in a mixed liquid, solid and gas state. The mixture collection chamber is prepared to separate the desirable parts of the mixture from the undesirable parts, and to collect the desirable parts to be forced through the next stage of the protocol.

The next stage of the protocol where the desirable parts of the mixture are collected and forced through is called the filtration and separation system. At the time when the mixture reaches this stage it is in the desired chemical state. This state may be an aqueous solution, a mixture or another state depending upon the choice of protocol up to now. This system is setup to filter any disposable parts of the mixture (for example, CO₂ converts to carbonic acid H₂CO₃ in water) from the liquid water. The

mechanical action on the mixture will separate the disposable parts to the disposal and the water to a chamber where it may be reused.

*It is possible that one might choose to use a compound other than H₂O if it is preferential for the given emission.

No References