This project is the development of a dielectric that will replace the use of glass as a dielectric in ozone generators. We are developing a ceramic that will have a dielectric constant in the range of from 500 to 1000 K. Glass now being employed around the world in ozone generators has a dielectric between 7 and 12 K. The energy is lost in the glass as heat. This energy loss produces two problems; as the glass temperature increases, it heats the oxygen which inhibits the generation of ozone. Also, when the oxygen containing ozone is hot the half life of ozone decreases. The energy lost in the glass dielectric will reduce the actual energy of the high voltage pulse that is used to ionize the oxygen. Thus, the ozone generating system needs a higher high voltage which increases the total power necessary to produce a specific concentration of ozone. Therefore the higher the dielectric constant is, less energy is needed, the more effective and economical the generator becomes.

We are developing a ceramic with a high K constant that can be sprayed on a stainless steel tube. By employing this procedure, not only do we have the advantages of the high K value, we will also have excellent heat dissipation since the dielectric is thin and in direct contact to the metal conductor.

During the last three months we have designed a complete ozone generator. We have had four stainless steel cylinders coated with our special mix of ceramic.

We have measured the dielectric cost per watt on the sprayed tube and it is still too low, less than 200 K. We are still going to use these tubes in our new ozone generator, so that we can learn just what we will gain with a high K value.

We have designed a dielectric ceramic coating of two thicknesses, 0.015 and 0.025. We will learn, from the data generated by the use of these tubes in an ozone generating system, the amount of energy that is required to produce ozone of a range from 10 to 15 percent by weight.

This last month has been an expensive month, because we have had to purchase the special ceramic micro granulars, less than 0.002 diameter, that have been coated with a plastic. We hope our next batch of ceramic powder will not need to be coated.
These next months we expect to finish building one or two complete ozone generators that will use the ceramic dielectric that we are developing.

The ozone generators will be of a new design that have never before been used, we think, by any other company and we hope to have it patented. Basically this design will not only have the ceramic as a part over the outside of the inner electrode, but the center electrode will also be water cooled. The advantage of this design, we feel, will be better cooling of the ceramic and make monitoring its temperature far simpler.

We expect to run a number of ozone generation tests varying the pressure of the $O_2$ from one psi to 400 psi to learn what pressure differences will do the output generation of ozone.

We will also measure the composition of the ceramic before it is sprayed on the stainless steel tubes and also after it has been coated over the tubes. This will be done so that we can monitor the mixtures of oxides. Presently we are trying to control the lead oxide loss. We seem to lose up to 50% of the lead during the coating procedure.

In our next report we hope to report how well and economically ozone can be produced by employing a ceramic as a dielectric.

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