Considerations regarding virus deactivation in a CEF device at atmospheric pressure

Technical brief

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The 2003 severe acute respiratory syndrome (SARS) and influenza virus H1N1 in 2009 were both triggered by airborne transmission of viral agents. According to the World Health Organisation COVID-19 is also spreading by airborne transmission.

The CEF (complex energy fields) device is operating continuously, circulating the contaminated air through the device. Disinfection with spray devices can not be used continuously in public spaces where people can not be evacuated such as subway stations, airports, public or government buildings, hospitals, etc. Chemical disinfectants may produce severe health problems or even death to the people who are nearby the disinfected area.

In certain conditions, in the CEF (Complex Energy Fields) device, interaction(s) between complex energy fields, waves and/or scalar entities can create a concentration of energy at points on, or near a metamaterial like electrode and on the molecules (pathogen itself), in which, the energy levels and/or field(s) intensity can exceed molecules bond strength, causing breaking the bonds of C=C, C-C, C-O, C-N, etc. Pathogens and organic substances are also simultaneously exposed to reactive oxygen species and reactive nitrogen species, Fig.1.

Additionally, within the CEF device, atmospheric pressure cold plasma (APCP) may be generated.

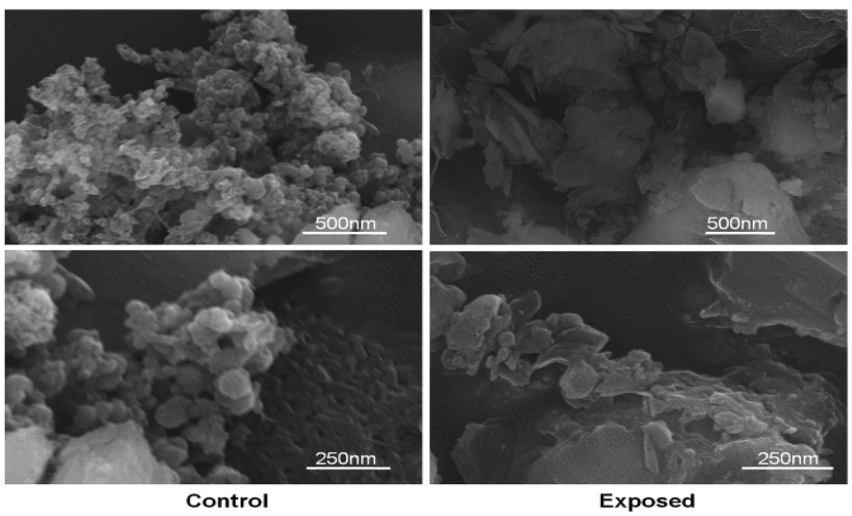

FIG 1. Scanning electron microscope images of waterborne MS2 viruses treated and untreated with the APCP. The gas carrier was ambient air, the plasma generation power was 24 W, and the exposure time was 120 s.

As a model, on the surface of MS2 viruses, the following proteins may exist: the maturation protein (40 kDa), the coat protein (13.86 kDa), the replicase protein (60 kDa), and the lysis protein (8.87 kDa). Data obtained by Wu et al, suggests that exposure only to APCP can significantly degrade the MS2 viral surface proteins.

When generating APCP with the ambient air carrier, within the CEF device, hydroxyl radicals may also be created.

At present time it is believed that damage to the viruses coating or surface proteins can be induced by reactive nitrogen and oxygen oxidative species, however, the mechanism and damage infliction is not well understood.

During CEF device operation, a fine structured black deposition on metamaterial like electrode has been observed. This suggests the decomposition of airborne organic matter and/or aerosols that entered into the device.

Since the mechanism of viruses destruction is not well known, recent rapid propagation of COVID-19, and the possibility of the emergence of other airborne lethal viruses in the future, the CEF (Complex Energy Fields) device was tested in certain operation modes, in which on the tip of the device emitter, the temperature can be very high, reaching from 400 degrees Celsius to 1000 degrees Celsius or more (stainless steel can be melted). Any airborne pathogen or virus reaching this area will be instantly inactivated if not incinerated. As an illustration, the size of viruses can be in the nanometer range, but the size of the emitter tip can be in the range of tenths of a millimeter or more, depending on the power level and the parameters of operation.

Future research and development efforts could be directed to determine the mechanism of deactivation of human viral pathogens, such as COVID-19, by the CEF (Complex Energy Fields) technology, in the normal operation range, should adequate financing would be available.

References:

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