

WHAT IS CLAIMED IS:

1. A method of disinfecting a surface suspected of contamination with a virus, comprising:

producing a reactive gas by forming a high-voltage cold plasma (HVCP) from a working gas with a dielectric barrier discharge (DBD) system at a voltage of 20kV to 150kV;

transporting the reactive gas at least 1 meter away from the HVCP; followed by

contacting the surface with the reactive gas to disinfect the surface, wherein a host infected with the virus had contacted the surface.

2. A method of disinfecting a surface contaminated with a virus, comprising:

producing a reactive gas by forming a high-voltage cold plasma (HVCP) from a working gas with a DBD system at a voltage of 20kV to 150kV;

transporting the reactive gas at least 1 meter away from the HVCP;

followed by contacting the surface with the reactive gas to disinfect the surface,

wherein a host infected with the virus had contacted the surface.

3. A method of disinfecting a surface contaminated with a virus, comprising:

(I) producing a reactive gas by forming a high-voltage cold plasma (HVCP) from a working gas with a DBD system at a voltage of 20kV to 150kV;

(II) transporting the reactive gas at least 1 meter away from the HVCP;

(III) followed by contacting the surface with the reactive gas to disinfect the surface,

(IV) obtaining a virus sample from the surface after the contacting, and

(V) determining an amount of remaining virus after exposure to the reactive gas,

wherein, if the surface is not disinfected by the contacting, repeating (I), (II) and (III) until the surface is disinfected.

4. The method of any of the preceding claims, wherein the surface is an interior surface of a made-made structure.

5. The method of any of the preceding claims, wherein the host is a human or an animal.

6. The method of any of the preceding claims, wherein the host is a plant.

7. The method of any of the preceding claims, wherein the man-made structure comprises a room or a passage.

8. The method of any of the preceding claims, wherein the man-made structure comprises a vehicle.

9. The method of any of the preceding claims, wherein the contacting is carried out in a room having a volume of at least 8 cubic meters.

10. The method of any of the preceding claims, wherein the room is a hospital room.

11. The method of any of the preceding claims, wherein the room is a cruise ship cabin.

12. The method of any of the preceding claims, wherein surface is the surface of a medical device.

13. The method of any of the preceding claims, wherein the contacting is for 1 second to 24 hours.

14. The method of any of the preceding claims, wherein the contacting is for 30 minutes to 2 hours.

15. The method of any of the preceding claims, wherein the contacting is for at least 90 minutes.

16. The method of any of the preceding claims, wherein the reactive gas comprises at least one reactive or excited species other than ozone.

17. The method of any of the preceding claims, wherein the virus is an RNA virus.

18. The method of any of the preceding claims, wherein the virus is selected from the group consisting of: rotavirus, rhinovirus, porcine reproductive and respiratory syndrome virus (PRRSV), hantavirus, norovirus, measles virus, ebola virus, influenza virus, avian virus, Zika virus, Middle East respiratory syndrome (MERS) coronavirus, severe acute respiratory syndrome (SARS) coronavirus and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

19. The method of any of the preceding claims, wherein the virus is severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

20. The method of any of the preceding claims, wherein the working gas comprises MA65.

21. The method of any of the preceding claims, wherein the virus is a DNA virus.

22. The method of any of the preceding claims, wherein the virus is African swine fever virus.

23. The method of any of the preceding claims, wherein the contacting the surface is sufficient to produce at least a 2- $\log_{10}$ reduction by the MS2 phage assay test.

24. The method of any of the preceding claims, wherein the contacting the surface is sufficient to produce at least a 3- $\log_{10}$ reduction by the MS2 phage assay test.

25. The method of any of the preceding claims, wherein the contacting the surface is sufficient to produce at least a 4- $\log_{10}$ reduction by the MS2 phage assay test.

26. The method of any of the preceding claims, wherein the contacting the surface is sufficient to produce at least a 5- $\log_{10}$ reduction by the MS2 phage assay test.

27. The method of any of the preceding claims, wherein the contacting the surface is sufficient to produce at least a 6- $\log_{10}$ reduction by the MS2 phage assay test.

28. The method of any of the preceding claims, wherein the determining uses the MS2 phage plaque assay test.

29. The method of any of the preceding claims, wherein the determining uses an enzyme-linked immunosorbent assay (ELISA) test to determine the amount of the virus.