CLAIMS

1. An enclosed space system through which vehicles may pass, the enclosed space system including interior surfaces, a photocatalytic coating on an interior surface of the enclosed space system, and a lighting system in attachment with an interior surface of the enclosed space system, the lighting system including light sources emitting wavelengths in the range between 340 nm and 450 nm, the lighting system arranged to illuminate the photocatalytic coating with the wavelengths in the range between 340 nm and 450 nm, wherein the photocatalytic coating is activatable by the wavelengths in the range between 340 nm and 450 nm.

2. The enclosed space system of Claim 1, wherein the lighting system does not emit light with wavelengths below 340 nm.

3. The enclosed space system of Claims 1 or 2, (i) wherein the enclosed space system is a tunnel, or (ii) wherein the enclosed space system is a road tunnel, or (iii) wherein the enclosed space system is a rail tunnel, or (iv) wherein the enclosed space system is a pedestrian tunnel.

4. The enclosed space system of Claims 1 or 2, wherein the enclosed space system is a car park in a building, a car park in a ferry, or a car park in a car train.

5. The enclosed space system of any previous Claim, (i) wherein a surface coated with the photocatalytic coating is illuminated with the wavelengths in the range between 340 nm and 450 nm at an intensity greater than 1.0 W/m^2, or (ii) wherein a surface coated with the photocatalytic coating is illuminated with the wavelengths in the range between 340 nm and 450 nm at an intensity in the range of 1.0 W/m^2 to 50 W/m^2, or (iii) wherein a surface coated with the photocatalytic coating is illuminated with the wavelengths in the range between 340 nm and 450 nm at an intensity in the range of 1.0 W/m^2 to 20 W/m^2, or (iv) wherein a surface coated with the photocatalytic coating is illuminated with the wavelengths in the range between 340 nm and 450 nm at an intensity in the range of 1.0 W/m^2 to 10 W/m^2.

6. The enclosed space system of any previous Claim, wherein the light sources are,

or include, light emitting diodes (LEDs).

7. The enclosed space system of any previous Claim, (i) wherein the system is arranged to reduce an amount of NOx gases in the enclosed space, or (ii) wherein the system is arranged to reduce an amount of SOx gases in the enclosed space, or (iii) wherein the system is arranged to reduce an occurrence of bacteria and molds on the surface, or (iv) wherein the system is arranged to reduce an amount of volatile organic compounds gases in the enclosed space.

8. The enclosed space system of any previous Claim, wherein the photocatalytic coating is a cement-based hydraulic binding photocatalytic coating.

9. The enclosed space system of any previous Claim, wherein the photocatalytic coating is derived from a cement-based photocatalytic composition, which comprises:

(a) at least one cement binder;

(b) at least one photocatalyst;

(c) at least one cellulose ether;

(d) at least one fluidizing agent;

(e) at least one first calcareous filler in the form of particles of which at least 95% by weight has a dimension not greater than 100 μm;

(f) at least one second calcareous filler in the form of particles of which at least 95% by weight has a dimension not greater than 30 μm;

(g) at least one silane supported on an inorganic support in the form of powder.

10. The enclosed space system of Claim 9, wherein the photocatalytic composition comprises:

(a) from 15 to 60% by weight, preferably from 20 to 50% by weight, of at least one cement binder;

(b) from 0.5 to 12% by weight, preferably from 1 to 8% by weight, of at least one photocatalyst;

(c) from 0.02 to 3% by weight, preferably from 0.05 to 1.5% by weight, of at least one cellulose ether;

(d) from 0.05 to 5% by weight, preferably from 0.1 to 2% by weight, of at least one fluidizing agent;

(e) from 10 to 50% by weight, preferably from 15 to 35% by weight, of at least one first calcareous filler in the form of particles of which at least 95% by weight has a dimension not greater than 100 μm;

(f) from 10 to 50% by weight, preferably from 15 to 35% by weight, of at least one second calcareous filler in the form of particles of which at least 95% by weight has a dimension not greater than 30 μm;

(g) from 0.05 to 5% by weight, preferably from 0.01 to 3% by weight, of at least one silane supported on an inorganic support in the form of powder.

11. The enclosed space system of Claims 9 or 10, wherein the cement binder (a) is a Portland cement.

12. The enclosed space system of any of Claims 9 to 11, wherein the photocatalyst (b) is photocatalytic titanium dioxide, mainly in anatase crystalline form.

13. The enclosed space system of Claim 12, wherein the photocatalytic titanium dioxide has a granulometry such as at least 95% by weight has a dimension not higher than 50 nm, preferably not higher than 20 nm.

14. The enclosed space system of any of Claims 9 to 13, wherein the cellulose ether (c) has a Brookfield viscosity RVT at 20°C from 100 to 70,000 mPa.s, preferably from 100 to 30,000 mPa.s, more preferably from 200 to 10,000 mPa.s.

15. The enclosed space system of any of Claims 9 to 14, wherein the first calcareous filler (e) is in the form of particles of which at least 95% by weight has a dimension not greater than 70 μm, while the second calcareous filler (f) is in the form of particles of which at least 95% by weight has a dimension not greater than 20 μm.

16. The enclosed space system of any of Claims 9 to 15, wherein the first calcareous filler (e) is in the form of particles of which not more than 5% by weight has a dimension not greater than 30 μm, preferably not greater than 20 μm.

17. The enclosed space system of any of Claims 9 to 16, wherein the calcareous fillers (e) and (f) are present in a weight ratio (e)/(f) from 0.2 to 2.0, preferably from 0.5

to 1.5.

18. The enclosed space system of any of Claims 9 to 17, wherein the supported silane (g) is in the form of particles of which at least 95% by weight has a dimension not greater than 100 μ, preferably not greater than 80 μ.

19. The enclosed space system of any of Claims 9 to 18, further comprising: (h) at least one hydrophobized vinyl polymer, preferably a terpolymer of vinylchloride, ethylene and a vinyl ester CH_2=CH-O-C(=O)-R, wherein R is an alkyl, linear or branched, C_4-C_{24}.

20. The enclosed space system of any of Claims 9 to 19, further comprising: (i) at least one salt of a long chain carboxylic acid.

21. The enclosed space system of any of Claims 9 to 20, wherein, after application and drying, the photocatalytic composition forms a coating layer having a thickness from 0.05 mm to 1 mm, preferably from 0.1 to 0.5 mm.

22. Use in a tunnel of light emitting diodes emitting wavelengths in the range between 340 nm and 450 nm to illuminate an interior surface of the tunnel coated with a photocatalytic coating, wherein the photocatalytic coating is activatable by wavelengths in the range between 340 nm and 450 nm, and wherein the light emitting diodes do not emit light with wavelengths below 340 nm.