CLAIMS

1. A primer coating composition for a metal~~, preferably steel,~~ substrate comprising an~~ suitable~~ organic binder selected from an alkyd, acrylic or epoxy resin binder and~~, characterised in that there is~~ at least one semiconductor photocatalyst dispersed throughout the primer coating composition.

2. A process of coating a metal substrate~~, preferably steel, surface~~ comprising the following steps:-

a) applying a primer coating composition comprising an organic binder and at least one semiconductor photocatalyst dispersed throughout the primer coating composition~~ in accordance with the first aspect of the present invention~~ to the metal substrate;

b) exposing the primer coating composition to UV radiation~~, preferably sunlight,~~ to at least partially effect photocatalytic degradation of the organic binder to form a photocatalytically degraded primer coat;

c) optionally washing the surface of the photocatalytically degraded~~ exposed~~ primer coat to form a washed primer coat; and

d) applying a top-coat directly to the photocatalytically degraded and, optionally, washed primer coat surface.

3. The process according to claim 2 wherein the metal is steel.

4. The process according to claim 3 or 4 wherein in step b) the UV radiation is sunlight.

5. The process of any one of claims 2-4 wherein the organic binder is selected from the group consisting of alkyd, polyester, urethane, acrylic or epoxy resin binder.

~~3~~6. Use of a semiconductor photocatalyst as a top-coat to primer adhesion promoter or as a primer to top-coat delamination inhibitor in a primer coating composition.

7. Use according to claim 6 wherein the organic binder is selected from the group consisting of alkyd, polyester, urethane, acrylic or epoxy resin binder.

~~4~~8. ~~A~~The primer coating composition of claim 1, process of any one of claims 2-5 or use of claim 6 or 7 ~~according to any preceding claim~~ wherein the semiconductor photocatalyst is in the form of particles.

~~5~~9. ~~A~~The primer coating composition of claim 1, process of any one of claims 2-5, use of claim 6 or 7 or the primer coating composition, process or use according to claim 8, ~~any preceding claim,~~ wherein the ~~metal oxide may be selected from any~~ semiconductor photocatalyst is a metal oxide.

10. The primer coating composition, process or use according to claim 8 or 9 wherein the semiconductor photocatalyst is a metal oxide selected from the group consisting of~~, for example,~~ anatase TiO_2, brookite TiO_2, strontium titanate, tin oxide, zinc(II) oxide and iron oxide.

11. The primer coating composition of claim 1, process of any one of claims 2-5, use of claim 6 or 7 or the primer coating composition, process or use according to any one of claims 8-10 wherein the semiconductor photocatalyst is ~~or~~ a mixture of ~~any~~ two or more semiconductor photocatalysts.

~~6~~12. ~~A~~The primer coating composition of claim 1, process of any one of claims 2-5, use of claim 6 or 7, or the primer coating composition, process or use according to any one of claims 8-10 ~~preceding claim~~, wherein the semiconductor photocatalyst is anatase TiO_2.

~~7~~13. ~~A~~The primer coating composition of claim 1, process of any one of claims 2-5, use of claim 6 or 7, or the primer coating composition, process or use according to any one of claims 8-12 ~~preceding claim,~~ wherein the organic binder is ~~selected from alkyd, polyester, urethane, acrylic or epoxy resin binder, preferably~~ an epoxy binder.

~~8~~14. ~~A~~The primer coating composition of claim 1, process of any one of claims 2-5, use of claim 6 or 7, or the primer coating composition, process or use according to any one of claims 8-13 ~~preceding claim~~, wherein the semiconductor photocatalyst in the composition is in the range of 1-40% w/w total dry composition.

~~9~~15. A coated substrate comprising a metal substrate, an initial primer coat comprising an organic binder, at least one semiconductor photocatalyst dispersed throughout

the initial primer coat ~~according to claim 1~~ and located on the substrate and at least one top-coat.

~~10~~16. A coated substrate comprising a substrate and a series of coatings on at least one surface of the substrate including one or more inner coatings and an outer coating, at least one of the said inner coatings said coatings comprising an organic binder, at least one semiconductor photocatalyst dispersed throughout the coatings. ~~being in accordance with claim 1.~~

~~11~~17. ~~A~~The primer coating composition of claim 1, process of any one of claims 2-5, use of claim 6 or 7, or the primer coating composition, process or use according to any one of claims 8-14 ~~preceding claim~~, wherein the primer coating composition further comprises additives selected from the group consisting of~~additives in the primer coats of the present invention include~~:- auxiliaries or additives such as solvents, colorants, mineral oils, fillers, elastomers, antioxidants, stabilizers, defoamers, extenders, plasticizers, catalysts, pigments, pigment pastes, reinforcing agents, flow control agents, thickening agents, flame-retarding agents, additional hardeners and additional curable compounds.~~, depending on the application.~~

~~12~~18. ~~A~~The process according to claim 2~~,~~ wherein the said primer coating composition ~~layer~~ is applied directly to an un-primed metal substrate so that only two coats, ~~the~~a primer coat and a top-coat, are thereby applied to the metal substrate.

~~13~~19. A two layer coating system for a metal substrate ~~such as a ship's hull comprising, preferably, consisting of,~~ comprising a first primer coat comprising an organic binder and at least one semiconductor photocatalyst dispersed throughout the first primer coat, or a primer coating composition according to any one of claims 1 or 8-14 or 17 ~~according to any of claims 1 or 3-12~~ and a second top-coat wherein the top coat is either:-

a) an epoxy based top coat,

b) a polyurethane based top coat,

c) an alkyd/polyester resin based top coat, or

d) an acrylic resin based top coat.

~~14~~20. ~~A~~The process according to any one of claims 2-~~13~~14, 17 or 18, wherein after applying the primer coating composition a drying ~~the primer drying step an~~ interval of 10-500 days ~~exposure, typically outdoor exposure,~~ elapses before application of a top-coat.

~~15~~21. Use of a primer composition comprising an organic binder, at least one semiconductor photocatalyst dispersed throughout the primer composiiton or a primer coating composition according to any one of claims 1 or claims ~~3~~8-14~~12~~ or 17-18 as a primer having improved primer to top-coat delamination inhibition.

~~16~~22. Use of a semiconductor photocatalyst as a top-coat to primer delamination inhibitor in a primer composition.

~~17~~23. Use of a primer composition comprising an organic binder, at least one semiconductor photocatalyst dispersed throughout the primer composition or a primer coating

composition according to any one of claims 1 or claims ~~3~~8-14~~12~~ or 17-18 as a primer.

~~18~~24. Use of a primer composition comprising a suitable organic binder, at least one semiconductor photocatalyst dispersed throughout the primer composition, or a primer coating composition according to any one of claims 1 or 5-14 or 17-18 ~~claims 3-12~~ as a primer having improved primer to top-coat adhesion.

~~19~~25. A primer coating composition, coating system, substrate, use or process according to any one of the preceding claims wherein~~characterised in that~~ the semiconductor photocatalyst is a photocatalytic metal oxide.