CLAIMS

We claim:

1. An optical product comprising:

a) a polymeric substrate, provided with an infrared-reflective metal layer on an outer surface thereof that is subject to oxidation;

b) a protective coating, comprising one or more of a metal oxide or a metal nitride, deposited directly on the infrared-reflective metal layer using chemical or physical vapor deposition; and

c) a composite pigment coating, deposited on the protective coating, comprising at least a first layer and a second layer, at least one of which layers comprises a first pigment, wherein each of the first layer and the second layer includes a binding group component which together form a complementary binding group pair,

wherein the first layer and the second layer together form a layer-by-layer bilayer, and

wherein the composite pigment coating comprises a plurality of layer-by-layer bilayers, each of which bilayers may be the same or different than the bilayer formed from the first layer and the second layer.

2. The optical product of claim 1, wherein the polymeric substrate comprises a polyethylene terephthalate film.

3. The optical product of claim 1, wherein the infrared-reflective metal layer comprises aluminum.

4. The optical product of claim 1, wherein the polymeric substrate provided with an infrared-reflective metal layer exhibits a visible light transmission of at least 70% prior to the protective coating being deposited on the infrared-reflective metal layer.

5. The optical product of claim 1, wherein the one or more of a metal oxide or a metal nitride comprises silica.

6. The optical product of claim 1, wherein the protective coating has a thickness of from 5 nm to 150 nm.

7. The optical product of claim 1, wherein the composite pigment coating has a total thickness of 5 nm to 300 nm.

8. The optical product of claim 1, wherein the first pigment is provided on its surface with a binding group component.

9. The optical product of claim 1, wherein the first pigment comprises carbon black.

10. The optical product of claim 1, wherein the composite pigment coating comprises a second pigment which, in combination with the first pigment, provide an additive effect on the perceived color of the optical product.

11. The optical product of claim 1, in the form of a window film that is applied to a vehicle.

12. The optical product of claim 10, wherein the vehicle is an automobile, an aircraft, or a boat.

13. The optical product of claim 2, wherein the optical product is a composite interlayer for laminated glass.

14. The optical product of claim 1, wherein at least one of the first layer and the second layer of the composite pigment coating is formed from an aqueous solution.

15. A colored window film, comprising:

a) a polyethylene terephthalate film, provided with a metal layer on an outer surface thereof that is subject to oxidation;

b) silica, deposited directly on the metal layer using chemical vapor deposition; and

c) a composite pigment coating, deposited on the silica, that comprises at least a first layer and a second layer, at least one of which layers comprises a first pigment, wherein each of the first

layer and the second layer include a binding group component which together form a complementary binding group pair,

wherein the first layer and the second layer together form a layer-by-layer bilayer, and

wherein the composite pigment coating comprises a plurality of layer-by-layer bilayers, each of which bilayers may be the same or different than the bilayer formed from the first layer and the second layer.

16. The method of claim 1, wherein each of the layers of a given bilayer comprises a polyionic binder, an insoluble pigment particle, or both.

17. The method of claim 1, wherein the first layer comprises a polycationic binder and the second layer comprises a negatively-charged pigment.

18. The method of claim 17, wherein the polycationic binder comprises poly(allylamine hydrochloride).

19. The method of claim 16, wherein the insoluble pigment particle comprises carbon black pigment.

20. The method of claim 1, wherein the complementary binding group pair exhibits electrostatic binding.