the coated article, heating the entire coated article by placing it into a furnace, flash annealing only a surface of the transparent conductive oxide layer or passing an Eddy current through the transparent conductive oxide layer.

[0016] A coated article is a substrate having a coating stack. At least a portion of the substrate is coated with a functional coating. A protective layer is applied over at least a portion of the functional coating. The protective layer has a first protective film over at least a portion of the functional coating, and a second protective film over at least a portion of the functional coating. The second protective film is the last film within the coating stack, and includes titania and alumina. Optionally, a third protective film can be positioned between the first protective film and the second protective film, or between the first protective film and the functional coating.

[0017] A method of making a coated article including providing a substrate. A functional coating is applied over at least a portion of the substrate. A first protective film is applied over at least a portion of the functional coating. A second protective film that includes titania and alumina is applied over at least a portion of the first protective film. Optionally, a third protective film is applied between the first protective film and the second protective film, or between the first protective film and the functional coating.

[0018] A method of reducing the absorption, resistance or emissivity of a transparent conductive oxide layer. A substrate is provided. A transparent conductive oxide layer is applied over at least a portion of the substrate in an atmosphere that comprises between 0 % and 2.0 % oxygen.

[0018a] In one aspect, the present disclosure relates to a method of reducing a sheet resistance of a coated article comprising applying a coating to a substrate wherein the coating comprises a transparent conductive oxide layer at room temperature; and processing the transparent conductive oxide layer by flash annealing using a flash lamp to heat a surface of the transparent conductive oxide layer for approximately 5-30 seconds so that the transparent conductive oxide layer reaches a temperature of above 193^{o}C (380^{o}F) and no more than 470^{o}C (878^{o}F).

[0018b] In another aspect, the present disclosure relates to a method of making a coated article comprising the steps of applying a transparent conductive oxide layer over a substrate, flash annealing the transparent conductive oxide layer by using a flash lamp to heat a top surface of the transparent conductive oxide layer for approximately 5-30 seconds so that the top surface of the transparent conductive oxide layer reaches a temperature of above 193^{o}C (380 ^{o}F) and no more than 470^{o}C (878°F).

[0019] A coated article having reduced absorption, resistance or emissivity comprising a transparent conductive oxide layer made by the following steps. A substrate is provided. A transparent conductive oxide layer is applied over at least a portion of the substrate in an atmosphere that comprises between 0 % and 2.0 % oxygen.

BRIEF DESCRIPTION OF THE DRAWING(S)

[0020] The patent or application file contains at least one drawing executed in color. Copies of this patent or patent application publication with color drawing(s) will be provided by the Office upon request and payment of the necessary fee.

[0021] Figs. 1a, 1b, 1c and 1d are side views (not to scale) of coatings incorporating a feature of the invention;

THE INVENTION CLAIMED IS

1. A method of reducing a sheet resistance of a coated article comprising applying a coating to a substrate wherein the coating comprises a transparent conductive oxide layer at room temperature; and processing the transparent conductive oxide layer by flash annealing using a flash lamp to heat a surface of the transparent conductive oxide layer for approximately 5-30 seconds so that the transparent conductive oxide layer reaches a temperature of above 193ºC (380ºF) and no more than 470ºC (878ºF).

2. The method according to claim 1 wherein the transparent conductive oxide layer is at least 125 nm and at most nm to 950 nm.

3. The method according to claim 1 wherein the transparent conductive oxide layer comprises tin-doped indium oxide and is at least 105 nm and at most 171 nm, and wherein the sheet resistance of the coated article after the processing step is less than 20 Ω/□.

4. The method according to claim 1, wherein the transparent conductive oxide layer comprises gallium-doped zinc oxide having a thickness of at least 320 nm and at most 480 nm and wherein the sheet resistance of the coated article after the processing step is less than 20 Ω/□.

5. The method according to claim 1, wherein the transparent conductive oxide layer comprises alumina-doped oxide having a thickness of at least 344 nm and at most 880 nm, and wherein the sheet resistance of the coated article after the processing step is less than 20 Ω/□.

6. The method according to claim 1, wherein the applying the coating step comprises a magnetron sputtered vacuum deposition process.

7. The method according to claim 1 wherein the transparent conductive oxide is heat at least to 224ºC (435ºF).

8. The method according to claim 1 further comprising applying a first protective film over at least a portion transparent conductive oxide layer, wherein the first protective film comprise titania, alumina, zinc oxide, tin oxide, zirconia, silica or mixtures thereof, and applying a second protective film over at least a portion of the transparent conductive oxide layer wherein the second protective film comprises titania and alumina,

and wherein the applying the first protective film and applying the second protective film occurs before or after the processing step.

9. The method according to claim 1 wherein the heating step does not raise the top surface of the transparent conductive oxide above 335°C (635°F).

10. The method according to claim 1 wherein the substrate is glass and the transparent conductive oxide has an absorption not greater than 0.3.

11. The method according to claim 1 wherein the substrate is glass and the transparent conductive oxide has an absorption at least as high as 0.05.

12. The method according to claim 1, wherein the coated article is a refrigerator door.

13. The method according to claim 1, wherein the applying step is done in an atmosphere that has an oxygen content supplied to the atmosphere of between 0% and 1.5%.

14. The method according to claim 1 wherein the substrate is glass and the transparent conductive oxide has an absorption not greater than 0.2 and at least as high as 0.05.

15. A method of making a coated article comprising the steps of applying a transparent conductive oxide layer over a substrate, flash annealing the transparent conductive oxide layer by using a flash lamp to heat a top surface of the transparent conductive oxide layer for approximately 5-30 seconds so that the top surface of the transparent conductive oxide layer reaches a temperature of above 193°C (380°F) and no more than 470°C (878°F).

16. The method according to claim 15 further comprising not heating the coated article above 335°C (635°F).

17. The method according to claim 15 wherein the transparent conductive oxide layer comprises tin-doped indium oxide having a thickness of at least 96 nm and at most 171 nm and a sheet resistance of less than 25 Ω/□.

18. The method according to claim 15 further comprising applying a protective layer over the transparent conductive oxide wherein the protective layer comprises titania and alumina.