We claim

1. A method of producing a coated substrate comprising a layer comprising a transparent conductive oxide or a semiconductor, comprising:
    a. depositing over at least a portion of a substrate in an inert atmosphere a transparent metal oxide or semiconductor layer having an absorption coefficient at a wavelength in the visible spectrum of at least 1,000 cm^{-1}; and
    b. flashing at least a portion of the transparent conductive oxide or semiconductor layer at a temperature ranging from 15ºC to 40ºC, with a pulse ranging from 3.5 J/cm^2 to 6.0 J/cm^2, of non-coherent light within the visible spectrum including light the wavelength in the visible spectrum at which the layer has an absorption coefficient of at least 1,000 cm^{-1}, wherein the pulse has a penetration depth in the layer that is less than the thickness of the layer producing a split layer of the transparent conductive oxide or semiconductor, where each layer of the split layer has a different physical property.
2. The method of claim 1, wherein the pulse ranges from 4.0 J/cm^2 to 5.0 J/cm^2.
3. The method of claim 1, wherein the transparent conductive oxide or semiconductor layer comprises a transparent conductive oxide (TCO).
4. The method of claim 3, wherein the transparent conductive oxide is an oxide of titanium, hafnium, zirconium, niobium, zinc, bismuth, lead, indium, tin, and mixtures thereof.
5. The method of claim 3, wherein the transparent conductive oxide is indium tin oxide, indium zinc oxide, aluminum zinc oxide, zinc tin oxide, indium cadmium oxide, cadmium tin oxide, barium stannate, strontium vanadate, or calcium vanadate.
6. The method of claim 3, wherein the TCO is deposited in an atmosphere of from 2 mTorr to 5 mTorr.
7. The method of claim 3, wherein the TCO is deposited in an atmosphere comprising 3% (by volume) or less of oxygen.
8. The method of claim 3, wherein the transparent conductive oxide is indium tin oxide.
9. The method of claim 8, wherein the indium tin oxide is deposited in an inert atmosphere with less than 2.5% oxygen, at a pressure ranging from 2 mTorr to 5 mTorr and/or wherein the indium tin oxide is deposited in a layer having a thickness ranging from 150nm to 400nm.

10. The method of claim 8, wherein the indium tin oxide is deposited in a layer having a thickness ranging from 300 nm to 2μm, and the penetration depth of the flash is less than the thickness of the indium tin oxide layer, producing a split layer of the transparent conductive oxide or semiconductor, where each layer of the split layer has a different physical property.

11. The method of claim 1, wherein the transparent conductive oxide or semiconductor layer comprises an oxygen-deficient transparent conductive oxide.

12. The method of claim 1, wherein the substrate is transparent.

13. The method of claim 1, wherein the substrate is a glass or a plastic material.

14. The method of claim 1, wherein the transparent conductive oxide or semiconductor layer comprises indium tin oxide deposited in a layer having a thickness ranging from 150nm to 400nm, in an atmosphere comprising 3% or less of oxygen.

15. The method of claim 1, wherein the pulse is a single pulse.

16. The method of claim 1, wherein a mask is placed between the light source and the stack of thin layers such that at least a portion of the flash is masked such that light from the flash is partially blocked by the mask from reaching the stack of thin layers, and reaches only a portion of the stack of thin layers, thereby producing a pattern of reflected color, transmitted color, differential sheet resistance, and/or emissivity in the stack of thin layers.