CLAIMS

1. An image sensor structure, comprising:

an image layer comprising an array of light detectors disposed therein;

a device stack disposed over the image layer;

an array of light guides disposed in the device stack, each light guide associated with at least one light detector of the array of light detectors;

a passivation stack disposed over the device stack, the passivation stack comprising a bottom surface in direct contact with a top surface of the light guides;

an array of nanowells disposed in a top layer of the passivation stack, each nanowell associated with a light guide of the array of light guides; and

a crosstalk blocking metal structure disposed in the passivation stack, wherein the crosstalk blocking metal structure extends from at least a bottom surface to a top surface of a layer in the passivation stack, wherein the crosstalk blocking metal structure reduces crosstalk within the passivation stack.

2. The image sensor structure of claim 1,

wherein the passivation stack comprises a plurality of layers, the plurality of layers comprising a first (1st) passivation layer disposed over the light guides and a 1st chemical protection layer disposed over the 1st passivation layer.

3. The image sensor structure of claim 2, wherein the crosstalk blocking metal structure from at least a bottom surface to a top surface of the 1st passivation layer.

4. An image sensor structure, comprising:

an image layer comprising an array of light detectors disposed therein;

a device stack disposed over the image layer;

an array of light guides disposed in the device stack, each light guide associated with at least one light detector of the array of light detectors;

a passivation stack disposed over the device stack, the passivation stack comprising a bottom surface in direct contact with a top surface of the light guides;

an array of nanowells disposed in a top layer of the passivation stack, each nanowell associated with a light guide of the array of light guides; and

a crosstalk blocking metal structure disposed in the passivation stack, wherein the crosstalk blocking metal structure comprises parallel metal layers, wherein the crosstalk blocking metal structure reduces crosstalk within the passivation stack.

5. The image sensor structure of claim 2, wherein the plurality of layers further comprises:

a second (2nd) passivation layer disposed over the 1st chemical protection layer; and

a 2nd chemical protection layer disposed over the 2nd passivation layer;

wherein the nanowells are disposed in a top layer of the 2nd chemical protection layer.

6. The image sensor structure of claim 5, wherein the crosstalk blocking metal structure comprises parallel metal layers disposed in the 2nd passivation layer.

7. The image sensor structure of claim 5, wherein the crosstalk blocking metal structure extends from a bottom surface of the 1st passivation layer to a top surface of the 2nd passivation layer, the crosstalk blocking metal structure disposed between the nanowells.

8. The image sensor structure of claim 1, wherein the crosstalk blocking metal structure is composed of one of a tantalum (Ta), a tungsten (W), an aluminum (Al) and a copper (Cu).

9. The image sensor structure of claim 2, wherein the 1st passivation layer is composed of a silicon nitride (SiN) and the 1st chemical protection layer is composed of a tantalum pentoxide (Ta_2O_5).

10. The image sensor structure of claim 1, comprising a light shield layer disposed between the device stack and the passivation stack.

11. The image sensor structure of claim 5, wherein the 2nd passivation layer is composed of a silicon nitride (SiN) and the 2nd chemical protection layer is composed of a tantalum pentoxide (Ta_2O_5).

12. The image sensor structure of claim 4, wherein the parallel metal layers have a separation distance between the parallel metal layers that is one half a wavelength of the crosstalk or less.

13. The image sensor structure of claim 4, wherein the parallel metal layers have a width of the parallel metal layers that is one half the wavelength of the crosstalk or greater.

14. An image sensor structure, comprising:

an image layer comprising an array of light detectors disposed therein;

a device stack disposed over the image layer;

an array of light guides disposed in the device stack, each light guide associated with at least one light detector of the array of light detectors;

a passivation stack disposed over the device stack, the passivation stack comprising:

a 1st passivation layer comprising a bottom surface in direct contact with a top surface of the light guides,

a 1st chemical protection layer disposed over the 1st passivation layer,

a 2nd passivation layer disposed over the 1st chemical protection layer, and

a 2nd chemical protection layer disposed over the 2nd passivation layer;

an array of nanowells disposed in a top layer of the passivation stack, each nanowell associated with a light guide of the array of light guides; and

a crosstalk blocking metal structure disposed in the passivation stack, wherein the crosstalk blocking metal structure reduces crosstalk in the passivation stack, wherein the crosstalk blocking structure extends from the bottom surface of the 1st passivation layer to a top surface of the 1st passivation layer.

15. The image sensor structure of claim 14, wherein the crosstalk blocking structure comprises parallel metal layers disposed between the nanowells.

16. The image sensor structure of claim 14, wherein the crosstalk blocking structure comprises extends from the bottom surface of the 1st passivation layer to a top surface of the 2nd passivation layer.