Claims

1. A glass structure comprising:

a glass substrate;

a first dielectric layer formed over the glass substrate and having a high refractive index;

a second dielectric layer formed over the first dielectric layer and having a low refractive index;

a third dielectric layer formed over the second dielectric layer and having a high refractive index such that the second dielectric layer interposes the first dielectric layer and the third dielectric layer; and

a fourth dielectric layer formed over the third dielectric layer and having a low refractive index such that the third dielectric layer interposes the second dielectric layer and the fourth dielectric layer,

wherein each of the first dielectric layer and the third dielectric layer is formed from one of NbO, NbO2, Nb2O5, ZrO, Zr2O3, TiO and TiO2, and having a refractive index of between and including 2.0 and 2.3.

2. The glass substrate as in claim 1, the first dielectric layer having a thickness of between and including 5 nm and 100nm and the third dielectric layer having a thickness of between and including 50nm and 150nm.

3. The glass substrate as in claim 1, each of the second dielectric layer and the fourth dielectric layer being formed from SiO2.

4. The glass substrate as in claim 1, the second dielectric layer having a thickness of between and including 10nm and 100nm and the fourth dielectric layer having a thickness of between and including 30nm and 100nm.

5. The glass substrate as in claim 1, further comprising a protective layer formed over the fourth dielectric layer.

6. The glass substrate as in claim 6, the protective layer being formed from at least one of TiO2, ZrO2, Si3N4 and SiC.

7. The glass substrate as in claim 6, the protective layer having a thickness of between and including 2nm to 30nm.

8. The glass substrate as in claim 1, the third dielectric layer being thicker than the first dielectric layer and the fourth dielectric layer being thicker than the second dielectric layer.

9. The glass substrate as in claim 1, each of the first dielectric layer, the second dielectric layer, the third dielectric layer and the fourth dielectric layer being at least one of formed by magnetron sputtering, formed from inorganic non-metallic material and is Au and Ag free.

10. A glass structure forming method comprising:

forming a first dielectric layer formed having a high refractive index over a glass substrate by magnetron sputtering;

forming a second dielectric layer having a low refractive index over the first dielectric layer by magnetron sputtering;

forming a third dielectric layer having a high refractive index over the second dielectric layer by magnetron sputtering such that the second dielectric layer interposes the first dielectric layer and the third dielectric layer; and

forming a fourth dielectric layer having a low refractive index over the third dielectric layer by magnetron sputtering such that the third dielectric layer interposes the second dielectric layer and the fourth dielectric layer,

wherein each of the first dielectric layer and the third dielectric layer is formed from one of NbO, NbO2, Nb2O5, ZrO, Zr2O3, TiO and TiO2, and having a refractive index of between and including 2.0 and 2.3.

11. The method as in claim 10, each of the second dielectric layer and the fourth dielectric layer being formed from SiO2, wherein the second dielectric layer has a thickness of between and including 10nm and 100nm and the fourth dielectric layer has a thickness of between and including 30nm and 100nm.

12. The method as in claim 10, further comprising:

forming a protective layer formed over the fourth dielectric layer by magnetron sputtering, the protective layer being formed from at least one of TiO2, ZrO2, Si3N4 and SiC, and having a thickness of between and including 2nm to 30nm.

13. The method as in claim 10, the third dielectric layer being thicker than the first dielectric layer and the fourth dielectric layer being thicker than the second dielectric layer, wherein each of the first dielectric layer, the second dielectric layer, the third dielectric layer and the fourth dielectric layer being at least one of formed from inorganic non-metallic material and is Au and Ag free.