CLAIMS

What is claimed is:

1. A III-V/Si hybrid MOS optical modulator with a traveling-wave electrode comprising:

a first metallic layer comprising a plurality of first metallic sections arranged spaced apart from one another along a same plane;

a second metallic layer arranged spaced apart from the first metallic layer along another plane substantially parallel to the same plane of the plurality of first metallic sections;

a silicon layer arranged spaced apart from the first metallic layer;

a III-V compound semiconductor layer arranged between a first metallic section of the plurality of first metallic sections and the silicon layer;

at least one first connector coupled between the first metallic section and the III-V compound semiconductor layer; and

an oxide layer between the III-V compound semiconductor layer and the silicon layer,

wherein the oxide layer is of a thickness designed to allow for impedance and velocity matching of the modulator, and

the first metallic layer and the second metallic layer are to serve as the traveling-wave electrode.

2. The modulator of claim 1, further comprising at least one second connector coupled between the second metallic layer and at least another first metallic section from the plurality of first metallic sections of the first metallic layer.

3. The modulator of claim 1, wherein the traveling-wave electrode is driven by a Series-Push-Pull (SPP) driving scheme.

4. The modulator of claim 1, wherein the first metallic layer comprises three first metallic sections separate from one another.

5. The modulator of claim 1, wherein the second metallic layer comprises two second metallic sections separate from each other.

6. The modulator of claim 5, wherein each second metallic section has a spacing distance between an adjacent second metallic section of 5μm to 60μm.

7. The modulator of claim 1, wherein the thickness of the oxide layer is from 5nm to 50nm.

8. The modulator of claim 1, wherein the III-V compound semiconductor layer comprises InGaAsP, InP or other III-V compound material with optical-electrical effect.

9. A method for manufacturing of a III-V/Si hybrid MOS optical modulator with a traveling-wave electrode, comprising steps of:

fabricating a III-V compound semiconductor layer and a silicon layer, wherein an oxide layer is between the III-V compound semiconductor layer and the silicon layer;

fabricating at least one first connector with connection to the III-V compound semiconductor layer;

fabricating a first metallic section of a first metallic layer with connection to the at least one first connector, wherein the first metallic layer comprises a plurality of first metallic sections arranged spaced apart from one another along a same plane;

fabricating at least one second connector with connection to another first metallic section from the plurality of first metallic sections of the first metallic layer; and

fabricating a second metallic layer with connection to the at least one second connector, the second metallic layer being arranged spaced apart from the first metallic layer along another plane substantially parallel to the same plane of the plurality of first metallic sections,

wherein the oxide layer is of a thickness designed to allow for impedance and velocity matching of the modulator, and

the first metallic layer and the second metallic layer serve as the traveling-wave electrode.

10. The method of claim 9, wherein the traveling-wave electrode is driven by a Series-Push-Pull (SPP) driving scheme.

11. The method of claim 9, wherein the first metallic layer comprises three first metallic sections separate from one another.

12. The method of claim 9, wherein the second metallic layer comprises two second metallic sections separate from each other.

13. The method of claim 12, wherein each second metallic section has a spacing distance between an adjacent second metallic section of 5μm to 60μm.

14. The method of claim 9, wherein the thickness of the oxide layer is from 5nm to 50nm.