What is claimed is:

1. A preparation method of a hydrogenated composite film, comprising:

introducing inert gas and hydrogen into a reaction chamber, and bombarding at least two materials in the reaction chamber and introduced hydrogen using plasma formed by the inert gas, such that the at least two materials are sputtered onto a substrate and react with hydrogen ions generated by the hydrogen to form a hydrogenated composite film layer;

wherein the at least two materials comprise a main material and at least one auxiliary material, and the main material comprises silicon or germanium; and the auxiliary material comprises at least one of a semiconductor material, a fourth main group element, and a transition element, and the main material and the auxiliary material are different materials; and

wherein a mass of the auxiliary material accounts for less than 20% of total raw material mass.

2. The preparation method of a hydrogenated composite film according to claim 1, wherein the main material is silicon, and the auxiliary material is germanium; or the main material is silicon, and the auxiliary material is niobium; or the main material is silicon, and the auxiliary material is titanium.

3. The preparation method of a hydrogenated composite film according to any one of claims 1 to 2, wherein introducing the inert gas and the hydrogen as a reaction gas into the reaction chamber and bombarding at least two materials in the reaction chamber and the introduced hydrogen using the plasma formed by the inert gas such that the at least two materials are sputtered onto the substrate and react with the hydrogen ions generated by the hydrogen to form the hydrogenated composite film layer comprises:

controlling sputtering parameters and flow rates of the introduced inert gas and the hydrogen to form the hydrogenated composite film layer with a refractive index greater than 3.5 and an extinction coefficient less than 0.005 under a wavelength of 700nm to 1800nm.

4. The preparation method of a hydrogenated composite film according to claim 3, wherein the sputtering parameters comprise sputtering power, a sputtering voltage, a sputtering current, a sputtering time and a sputtering temperature.

5. The preparation method of a hydrogenated composite film according to any one of claims 1 to 4, wherein one or more target materials exist in the reaction chamber, the target materials are prepared from the materials, one target material may be prepared from only one material, or one target material may be prepared from two or more materials.

6. The preparation method of a hydrogenated composite film according to any one of claims 1 to 5, wherein the inert gas introduced into the reaction chamber has a flow rate less than 800 standard milliliters per minute.

7. The preparation method of a hydrogenated composite film according to any one of claims 1 to 6, wherein the hydrogen introduced into the reaction chamber has a flow rate less than 400 standard milliliters per minute.

8. The preparation method of a hydrogenated composite film according to any one of claims 1 to 7, wherein the inert gas is argon.

9. An optical filter, comprising: a substrate, a hydrogenated composite film layer laminated on the substrate and fabricated using the preparation method of a hydrogenated composite film according to any one of claims 1 to 8, and a first film layer; the first film layer having a smaller refractive index than the hydrogenated composite film layer.

10. The optical filter according to claim 9, wherein the substrate is provided with a plurality of hydrogenated composite film layers and a plurality of first film layers, and the plurality of hydrogenated composite film layers and the plurality of first film layers are arranged alternately.

11. The optical filter according to any one of claims 9 to 10, wherein the first film layer is a medium-low refractive index material layer.

12. The optical filter according to any one of claims 9 to 11, wherein the first film layer is made of silicon oxide or silicon hydroxide.