CLAIMS

1. A method for manufacturing a semiconductor structure, comprising:

providing a substrate;

forming a semiconductor layer on the substrate;

performing P-type doping on the semiconductor layer to transform the semiconductor layer into an initial mask layer;

performing a first patterning treatment on the initial mask layer to form a mask layer with an opening; and

performing a second patterning treatment on the substrate by using an etching process with the mask layer as a mask, wherein an etching rate of the substrate is greater than an etching rate of the mask layer during the etching process;

wherein a material of the initial mask layer comprises a boron-silicon compound, and an atomic percent of boron atoms and silicon atoms in the boron-silicon compound is in a range of 1:1 to 3:2;

wherein the initial mask layer has an extinction coefficient of less than 0.45;

wherein the extinction coefficient of the initial mask layer is in a range of 0.34 to 0.44.

2. The method according to claim 1, wherein the initial mask layer has a thickness ranging from 400 nm to 460 nm along a direction from the substrate to the initial mask layer.

3. The method according to claim 1, wherein after performing the second patterning treatment on the substrate by using the etching process, part of the mask layer is retained, and a ratio of a thickness of the retained mask layer to a thickness of the initial mask layer along a direction

from the substrate to the initial mask layer is in a range of 0.13 to 0.16.

4. The method according to claim 3, wherein the thickness of the retained mask layer is in a range of 65 nm to 75 nm along the direction from the substrate to the initial mask layer.

5. The method according to claim 1, wherein forming the semiconductor layer comprises:

forming an initial semiconductor layer on the substrate; and

performing N-type doping or P-type doping on the initial semiconductor layer to transform the initial semiconductor layer into the semiconductor layer.

6. The method according to claim 1, wherein the initial mask layer is provided with a photolithography mark, wherein during the first patterning treatment on the initial mask layer by using a first etching process, the method further comprises:

providing a photomask having the opening and the photolithography mark,

wherein the photolithography mark of the photomask is overlapped with the photolithography mark of the initial mask layer.

7. The method according to claim 1, wherein providing the substrate comprises:

providing a base;

forming a stacked structure on the base, the stacked structure being configured to form a capacitor contact hole; and

performing the second patterning treatment on the substrate comprises:

etching the stacked structure by taking the mask layer as a mask and using the etching

process to form the capacitor contact hole.

8. The method according to claim 7, wherein forming the stacked structure comprises: forming a bottom support layer, a first dielectric layer, an intermediate support layer, a second dielectric layer and a top support layer stacked in sequence on the base.