# CLAIMS

1. A mask blank having a structure in which a light shielding film a multilayer reflective film, an absorber film, and a hard mask film are laminated on a substrate in this order, wherein:

the absorber film is made of a material containing tantalum;

the hard mask film is a single layer film having a composition gradient portion formed on a surface on the side opposite to the absorber film and a region adjacent thereto and increased in oxygen content,

the hard mask film is made of a material containing chromium, oxygen, and carbon with a total content of chromium, oxygen, and carbon being 95 atomic% or more;

a part of the hard mask film excluding the composition gradient portion has a chromium content of 50 atomic% or more,

a ratio of a carbon content [atomic%] divided by a total content [atomic%] of chromium, carbon, and oxygen in the part of the hard mask film excluding the composition gradient portion is 0.1 or more;

a ratio of a carbon content [atomic%] divided by a total content [atomic%] of chromium and carbon in the part of the hard mask film excluding the composition gradient portion is 0.14 or more; and

the content of nitrogen in the hard mask film is equal to or less than a detection limit value in composition analysis of X-ray photoelectron spectroscopy.

2. The mask blank according to claim 1, wherein the part of the hard mask film excluding the composition gradient portion has a chromium content of 80 atomic% or less.

3. The mask blank according to claim 1 or 2, wherein the part of the hard mask film excluding the composition gradient portion has a carbon content

of 10 atomic% or more and 20 atomic% or less.

4. The mask blank according to any one of claims 1 to 3, wherein the part of the hard mask film excluding the composition gradient portion has an oxygen content of 10 atomic% or more and 35 atomic% or less.

5. The mask blank according to any one of claims 1 to 4, wherein the hard mask film has a silicon content of 1 atomic% or less.

6. The mask blank according to any one of claims 1 to 5, wherein the part of the hard mask film excluding the composition gradient portion has a difference in content of each constituent element in a thickness direction that is less than 10 atomic%.

7. The mask blank according to any one of claims 1 to 6, wherein the hard mask film has a thickness of 15 nm or less.

8. The mask blank according to any one of claims 1 to 7, wherein the absorber film is made of a material containing tantalum and one or more elements selected from nitrogen, oxygen, boron, and carbon.

9. The mask blank according to any one of claims 1 to 8, wherein the absorber film has a thickness of 30 nm or more.

10. A method for manufacturing a reflective mask using the mask blank according to any one of claims 1 to 9, comprising:

the step of forming a transfer pattern on the hard mask film through dry etching using, as a mask, a resist film having a transfer pattern and using a mixed gas of a chlorine-based gas and an oxygen gas; and

the step of forming a transfer pattern on the absorber film through dry etching using, as a mask, the hard mask film provided with the transfer pattern and using a fluorine-based gas.

11. A method for manufacturing a semiconductor device, comprising the step of exposure-transferring a transfer pattern onto a resist film on a semiconductor substrate by using a reflective mask manufactured by the method

for manufacturing a reflective mask according to claim 10.