CLAIMS

WHAT IS CLAIMED IS:

1. A method of manufacturing a blank mask, comprising:

providing a light-transmitting substrate; and

disposing a light-shielding film on the light-transmitting substrate, the light-shielding film comprising a first light-shielding layer and a second light-shielding layer disposed on the first light-shielding layer,

wherein the second light-shielding layer includes a transition metal, and one or more of oxygen and nitrogen, wherein the transition metal comprises Cr,

wherein disposing the light-shielding film comprises

controlling a reflectance of a surface of the light-shielding film with respect to light having a wavelength of 193 nm to be 20% or more and 40% or less, and

controlling a hardness value of the second light-shielding layer to be 0.3 kPa or more and 0.55 kPa or less, the hardness value being determined using an atomic force microscope in contact mode at a scan rate of 0.5Hz.

2. The method of claim 1, wherein disposing the light-shielding film further comprises controlling a reflectance of the surface of the light-shielding film with respect to light having a wavelength of 350 nm to be 25% or more and 45% or less.

3. The method of claim 1, wherein:

disposing the light-shielding film further comprises controlling

a reflectance of the surface of the light-shielding film with respect to all light having a wavelength of 350 nm or more and 400 nm or less to be included in a range of 25% or more and 50% or less; and

a reflectance of the surface of the light-shielding film with respect to all light having a wavelength of 480 nm or more and 550 nm or less to be included in a range of 30% or more and 50% or less.

4. The method of claim 1, wherein disposing the light-shielding film further comprises controlling the hardness value of the second light-shielding layer to be 0.15 times or more and 0.55 times or less than a hardness value of the first light-shielding layer.

5. The method of claim 1, wherein disposing the light-shielding film further comprises controlling

a Young's modulus value of the second light-shielding layer to be 1.0 kPa or more.

6. The method of claim 1, wherein disposing the light-shielding film further comprises controlling

a Young's modulus value of the second light-shielding layer to be 0.15 times or more and 0.55 times or less than a Young's modulus value of the first light-shielding layer.

7. The method of claim 1, wherein disposing the light-shielding film further comprises controlling

an absolute value of a value obtained by subtracting a transition metal content of the first light-shielding layer from a transition metal content of the second light-shielding layer to be 30 at% or less.

8. The method of claim 1, wherein disposing the light-shielding film further comprises controlling

a thickness ratio of the first light-shielding layer and the second light-shielding layer to be 1:0.02 to 0.25.

9. A method of manufacturing a photomask, comprising:

providing a light-transmitting substrate; and

disposing a patterned light-shielding film on the light-transmitting substrate, the patterned light-shielding film comprising a first light-shielding layer and a second light-shielding layer disposed on the first light-shielding layer,

wherein the second light-shielding layer includes a transition metal, and one or more of oxygen and nitrogen, wherein the transition metal comprises Cr, and

wherein disposing the patterned light-shielding film comprises

controlling a reflectance of an upper surface of the patterned light-shielding film with respect to light having a wavelength of 193 nm to be 20% or more and 40% or less, and

controlling a hardness value of the second light-shielding layer to be 0.3 kPa or more and 0.55 kPa or less, the hardness value being determined using an atomic force microscope in contact mode at a scan rate of 0.5Hz.