CLAIMS

1. A reflective photomask blank comprising:

a substrate;

a reflective part formed on the substrate and configured to reflect an incident light; and

a low reflective part formed on the reflective part and configured to absorb an incident light,

wherein the low reflective part is a multi-layer structural body having at least two or more layers including an absorption layer and an outermost layer,

wherein the absorption layer contains at least one or more layers,

at least one layer of the absorption layer contains a total of 50 at% or more of one or more kinds of elements selected from a first material group, and

the first material group contains tellurium (Te), cobalt (Co), nickel (Ni), tin (Sn), platinum (Pt), indium (In), silver (Ag), copper (Cu), zinc (Zn), and bismuth (Bi), and oxides, nitrides, and oxynitrides of tellurium (Te), cobalt (Co), nickel (Ni), platinum (Pt), indium (In), silver (Ag), copper (Cu), zinc (Zn), or bismuth (Bi), and/or nitrides and/or oxynitrides of tin (Sn),

the outermost layer contains a total of 50 at% or more of one or more kinds of elements selected from a second material group,

wherein the second material group contains silicon (Si), titanium (Ti), tantalum (Ta), Chromium (Cr),

molybdenum (Mo), and ruthenium (Ru), and oxides, nitrides, and oxynitrides of titanium (Ti), tantalum (Ta), Chromium (Cr), molybdenum (Mo), or ruthenium (Ru), and/or oxynitrides of silicon (Si),

an extinction coefficient k to a wavelength of 13.5 nm of the absorption layer is $k > 0.041$, and

a film thickness of the low reflective part is a film thickness satisfying $0.5 \times da + dc \leq 21.5$ nm or a film thickness satisfying $0.5 \times da + dc \geq 27.5$ nm, wherein the film thickness of the absorption layer is da and the film thickness of the outermost layer is dc.

2. The reflective photomask blank according to claim 1, wherein the extinction coefficient k to the wavelength of 13.5 nm of the absorption layer is $k > 0.041$, and

a refractive index n of the absorption layer is $n \leq 0.98$.

3. The reflective photomask blank according to any claim 1 or 2, wherein the absorption layer contains a total of 50 at% or more of one or more kinds of elements selected from tin (Sn) and indium (In), and oxides, nitrides, and oxynitrides of indium (In), and/or nitrides and/or oxynitrides of tin (Sn).

4. The reflective photomask blank according to any one of claims 1 to 3, wherein the low reflective part

is a thin film having a total film thickness of the low reflective part of 17 nm or more and 45 nm or less, and having an OD value (Optical Density) of 1.0 or more, and contains a material selected from the first material group, and

the first material group contains tellurium (Te), cobalt (Co), nickel (Ni), tin (Sn), platinum (Pt), indium (In), silver (Ag), copper (Cu), zinc (Zn), and bismuth (Bi), and oxides, nitrides, and oxynitrides of tellurium (Te), cobalt (Co), nickel (Ni), tin (Sn), platinum (Pt), indium (In), silver (Ag), copper (Cu), zinc (Zn), or bismuth (Bi).

5. A reflective photomask comprising:

a substrate;

a reflective part formed on the substrate and configured to reflect an incident light; and

a low reflective part formed on the reflective part and configured to absorb an incident light,

wherein the low reflective part is a multi-layer structural body having at least two or more layers including an absorption layer and an outermost layer,

wherein the absorption layer contains at least one or more layers,

at least one layer of the absorption layer contains a total of 50 at% or more of one or more kinds of elements selected from a first material group, and

the first material group contains tellurium (Te), cobalt (Co), nickel (Ni), tin (Sn), platinum (Pt), indium

(In), silver (Ag), copper (Cu), zinc (Zn), and bismuth (Bi), and oxides, nitrides, and oxynitrides of tellurium (Te), cobalt (Co), nickel (Ni), platinum (Pt), indium (In), silver (Ag), copper (Cu), zinc (Zn), or bismuth (Bi), and/or nitrides and/or oxynitrides of tin (Sn),

the outermost layer contains a total of 50 at% or more of one or more kinds of elements selected from a second material group,

wherein the second material group contains silicon (Si), titanium (Ti), tantalum (Ta), Chromium (Cr), molybdenum (Mo), and ruthenium (Ru), and oxides, nitrides, and oxynitrides of titanium (Ti), tantalum (Ta), Chromium (Cr), molybdenum (Mo), or ruthenium (Ru), and/or oxynitrides of silicon (Si),

an extinction coefficient k to a wavelength of 13.5 nm of the absorption layer is $k > 0.041$, and

a film thickness of the low reflective part is a film thickness satisfying $0.5 \times da + dc \leq 21.5$ nm or a film thickness satisfying $0.5 \times da + dc \geq 27.5$ nm, wherein the film thickness of the absorption layer is da and the film thickness of the outermost layer is dc.