CLAIMS

1. A photomask blank comprising:

a hard mask film made of a chromium-containing material including tin on an inorganic material film configured to be etched by fluorine-containing dry etching, wherein

the inorganic material film contains one or more elements selected from a group of molybdenum, tantalum, hafnium, niobium, tungsten, and silicon.

2. The photomask blank according to claim 1, wherein

the chromium-containing material including tin has a content of tin of not under 0.01 times and not over 2 times than the content of chromium in atomic ratio.

3. The photomask blank according to claim 1 or 2, wherein

the chromium-containing material including tin is any one of a tin-chromium metal, tin-chromium oxide, tin-chromium nitride, tin-chromium carbide, tin-chromium oxide nitride, tin-chromium oxide carbide, tin-chromium nitride carbide, and tin-chromium oxide nitride carbide.

4. The photomask blank according to any one of claims 1 to 3, wherein

the material which can be etched with the fluorine-containing dry etching is a silicon-containing material including molybdenum and silicon.

5. The photomask blank according to claim 4, wherein

the film containing molybdenum and silicon is a light-shielding film.

6. A method for manufacturing a photomask using a blank described in any one of claims 1 to 5, the method comprising the steps of:

forming a hard mask pattern by subjecting the hard mask film to chlorine-containing dry etching; and

transferring a pattern to the inorganic material film by fluorine-containing dry etching using the hard mask pattern as an etching mask.

CLAIMS

1. A photomask blank comprising:

a hard mask film made of a chromium-containing material including tin on an inorganic material film configured to be etched by fluorine-containing dry etching, wherein

the inorganic material film contains one or more elements selected from a group of molybdenum, tantalum, hafnium, niobium, tungsten, and silicon, wherein

the chromium-containing material including tin has a content of tin of not under 0.01 times and not over 2 times than the content of chromium in atomic ratio.

2. The photomask blank according to claim 1, wherein

the chromium-containing material including tin is any one of a tin-chromium metal, tin-chromium oxide, tin-chromium nitride, tin-chromium carbide, tin-chromium oxide nitride, tin-chromium oxide carbide, tin-chromium nitride carbide, and tin-chromium oxide nitride carbide.

3. The photomask blank according to claim 1 or 2, wherein

the material which can be etched with the fluorine-containing dry etching is a silicon-containing material including molybdenum and silicon.

4. The photomask blank according to claim 3, wherein

the film containing molybdenum and silicon is a light-shielding film.

5. A method for manufacturing a photomask using a blank described in any one of claims 1 to 4, the method comprising the steps of:

forming a hard mask pattern by subjecting the hard mask film to chlorine-containing dry etching; and

transferring a pattern to the inorganic material film by fluorine-containing dry etching using the hard mask pattern as an etching mask.