CLAIMS

1. A substrate with multilayer reflective film provided with a multilayer reflective film for reflecting exposure light, the multilayer reflective film comprising a multilayer film obtained by alternately laminating low refractive index layers and high refractive index layers on a substrate,

wherein the multilayer reflective film contains krypton (Kr),

wherein the krypton (Kr) content of the multilayer reflective film is not more than 3 at%, and

the low refractive index layers comprise a metal selected from molybdenum (Mo), ruthenium (Ru), rhodium (Rh) and platinum (Pt), or an alloy thereof.

2. The substrate with multilayer reflective film according to claim 1, wherein the krypton (Kr) content of the multilayer reflective film is not more than 1.5 at%.

3. The substrate with multilayer reflective film according to claim 1 or 2, wherein the high refractive index layers consist of a material comprising silicon (Si).

4. The substrate with multilayer reflective film according to claim 3, wherein the material comprising silicon (Si) is Si or Si compound containing boron (B), carbon (C), nitrogen (N) and/or oxygen (O) in addition to Si.

5. The substrate with multilayer reflective film according to claim 3 or 4, wherein the ratio of Kr content to Si content is not more than 0.06.

6. The substrate with multilayer reflective film according any of claims 1 to 5, wherein the high refractive index layers are Si layers, and the Si layers have an amorphous structure.

7. The substrate with multilayer reflective film according to any of claims 1 to 6, wherein the krypton (Kr) content of the low refractive index layers is relatively low in comparison with the high refractive index layers.

8. The substrate with multilayer reflective film according to any of claims 1 to 7, comprising a protective film on the multilayer reflective film.

9. A reflective mask blank comprising an absorber film on the multilayer reflective

film of the substrate with multilayer reflective film according to any of claims 1 to 7 or on the protective film of the substrate with multilayer reflective film according to claim 8.

10. A reflective mask comprising an absorber pattern, obtained by patterning the absorber film of the reflective mask blank according to claim 9, on the multilayer reflective film.

11. A method of manufacturing a semiconductor device comprising a step for forming a transfer pattern on a transferred substrate by carrying out a lithography process with an exposure device using the reflective mask according to claim 10.