CLAIMS

1. A substrate with a multilayer reflective film, comprising: a substrate, a multilayer reflective film that reflects EUV light formed on the substrate, and a protective film formed on the multilayer reflective film; wherein,

reference marks formed to a concave shape are provided on the surface of the protective film, and

a surface layer of the reference marks contains an element that is the same as at least one of the elements contained in the protective film,

the surface layer is a region extending to a depth of 2 nm from the surface of the reference marks, and

a bottom of the reference marks has a shrink region where at least a portion of the plurality of films contained in the multilayer reflective film are shrunk.

2. The substrate with the multilayer reflective film according to claim 1, wherein the surface layer of the reference marks contains Ru.

3. The substrate with the multilayer reflective film according to claim 2, wherein the surface layer of the reference marks contains at least one selected from the group consisting of RuO, RuNbO, RuSi and RuSiO.

4. The substrate with the multilayer reflective film according to any of claims 1 to 3, having a mixing region, where at least a portion of a plurality of the films contained in the multilayer reflective film are mutually integrated, at the bottom of the reference marks.

5. The substrate with the multilayer reflective film according to any of claims 1 to 4, wherein the depth of the reference marks is 30 nm to 50 nm.

6. The substrate with the multilayer reflective film according to any of claims 1 to 5, wherein the surface layer of the multilayer reflective film on the opposite side from the substrate is a layer that contains Si.

7. A reflective mask blank having the substrate with the multilayer reflective film according to any of claims 1 to 6 and an absorber film that absorbs EUV light formed on the protective film of the substrate with the multilayer reflective film; wherein,

the shape of the reference marks is transferred to the absorber film.

8. A reflective mask having the substrate with the multilayer reflective film according to any of claims 1 to 6 and an absorber film pattern that absorbs EUV light formed on the protective film of the substrate with the multilayer reflective film; wherein, the shape of the reference marks is transferred to the absorber film pattern.

9. A method of manufacturing a semiconductor device having a step for forming a transfer pattern on a semiconductor substrate using the reflective mask according to claim 8.