

**What is claimed is:**

1. A method of manufacturing an extreme ultraviolet (EUV) mask blank comprising:
  - 5 forming on a substrate a multilayer stack which reflects EUV radiation, the multilayer stack comprising a plurality of reflective layer pairs;  
forming a capping layer on the multilayer stack;  
forming an absorber layer on the capping layer, the absorber layer comprising an antimony-containing material; and
  - 10 forming a hard mask layer on the absorber layer, the hard mask layer comprising a hard mask material selected from the group consisting of CrO, CrON, TaNi, TaRu and TaCu.
- 15 2. The method of claim 1, wherein the antimony-containing material is selected from the group consisting of SbN, an alloy of carbon and antimony, and an alloy of tantalum and antimony.
- 20 3. The method of claim 1, wherein the hard mask material comprises Cr in a range of from about 63.9 wt.% to about 98.4 wt.%, oxygen in a range from about 1.6 wt.% to about 33.7 wt.% and nitrogen in a range of from 0 wt.% to about 9.3 wt.%.
- 25 4. The method of claim 1, wherein the hard mask material comprises Ta in a range of from about 75.5 wt.% to about 96.5 wt.% and Ni in a range of from about 3.5 wt.% to about 24.5 wt.%.
- 30 5. The method of claim 1, wherein the hard mask material comprises Ta in a range of from 0 wt.% to about 72.9 wt.% and Ru in a range of from about 27.1 wt.% to about 100 wt.%.
6. The method of claim 1, wherein the hard mask material comprises Ta in a range of from about 0.2 wt.% to about 72.9 wt.% and Ru in a range of from about 27.1 wt.% to about 99.8 wt.%.

7. The method of claim 1, wherein the hard mask material comprises Ta in a range of from about 60.5 wt.% to about 94.2 wt.% and Cu in a range of from about 5.8 wt.% to about 39.5 wt.%.
- 5 8. The method of claim 1, wherein the hard mask layer has an etch rate and the absorber layer has an etch rate such that there is an etch selectivity of the hard mask layer to the absorber layer is in a range of from 5:1 to 30:1.
- 10 9. An extreme ultraviolet (EUV) mask blank comprising:  
a substrate;  
a multilayer stack which reflects EUV radiation, the multilayer stack comprising a plurality of reflective layer pairs;  
a capping layer on the multilayer stack of reflecting layers;  
15 an absorber layer, the absorber layer comprising an antimony-containing material; and  
a hard mask layer on the absorber layer, the hard mask layer comprising a hard mask material selected from the group consisting of CrO, CrON, TaNi, TaRu and TaCu.
- 20 10. The extreme ultraviolet (EUV) mask blank of claim 9, wherein the antimony-containing material is selected from the group consisting of SbN, an alloy of carbon and antimony, and an alloy of tantalum and antimony.
- 25 11. The extreme ultraviolet (EUV) mask blank of claim 10, wherein the hard mask material comprises Cr in a range of from about 63.9 wt.% to about 98.4 wt.%, oxygen in a range from about 1.6 wt.% to about 33.7 wt.% and nitrogen in a range of from 0 wt.% to about 9.3 wt.%.
- 30 12. The extreme ultraviolet (EUV) mask blank of claim 11, wherein the hard mask material comprises Ta in a range of from about 75.5 wt.% to about 96.5 wt.% and Ni in a range of from about 3.5 wt.% to about 24.5 wt.%.

13. The extreme ultraviolet (EUV) mask blank of claim 12, wherein the hard mask material is doped with at least one of oxygen and nitrogen in a range of from 0.1 wt.% to 10 wt.%.
- 5 14. The extreme ultraviolet (EUV) mask blank of claim 10, wherein the hard mask material comprises Ta in a range of from 0 wt.% to about 72.9 wt.% and Ru in a range of from about 27.1 wt.% to about 100 wt.%.
- 10 15. The extreme ultraviolet (EUV) mask blank of claim 10, wherein the hard mask material comprises Ta in a range of from about 0.2 wt.% to about 72.9 wt.% and Ru in a range of from about 27.1 wt.% to about 99.8 wt.%.
- 15 16. The extreme ultraviolet (EUV) mask blank of claim 15, wherein the hard mask material is doped with at least one of oxygen and nitrogen in a range of from 0.1 wt.% to 10 wt.%.
- 20 17. The extreme ultraviolet (EUV) mask blank of claim 10, wherein the hard mask material comprises Ta in a range of from about 60.5 wt.% to about 94.2 wt.% and Cu in a range of from about 5.8 wt.% to about 39.5 wt.%.
- 25 18. The extreme ultraviolet (EUV) mask blank of claim 17, wherein the hard mask material is doped with at least one of oxygen and nitrogen in a range of from 0.1 wt.% to 10 wt.%.
- 30 19. The extreme ultraviolet (EUV) mask blank of claim 10, wherein the hard mask layer has an etch rate and the absorber layer has an etch rate such that there is an etch selectivity of the hard mask layer to the absorber layer is in a range of from 5:1 to 30:1.
20. An extreme ultraviolet (EUV) mask blank comprising:  
a substrate;  
a multilayer stack which reflects EUV radiation, the multilayer stack comprising a plurality of reflective layer pairs including molybdenum (Mo) and silicon (Si);

a capping layer on the multilayer stack of reflecting layers;

an absorber layer, the absorber layer comprising an antimony-containing material selected from the group consisting of SbN, an alloy of carbon and antimony, and an alloy of tantalum and antimony; and

5 a hard mask layer on the absorber layer, the hard mask layer comprising a hard mask material selected from the group consisting of CrO, CrON, TaNi, TaRu and TaCu, wherein the hard mask layer has an etch rate and the absorber layer has an etch rate such that there is an etch selectivity of the hard mask layer to the absorber layer is in a range of from 5:1 to 30:1.

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