CLAIMS

1. A method of manufacture for an extreme ultraviolet reflective element comprising: providing a substrate; forming a multilayer stack on the substrate, the multilayer stack includes a plurality of reflective layer pairs having a first reflective layer formed from silicon and a second reflective layer having a preventative layer separating a lower amorphous molybdenum layer and an upper amorphous molybdenum layer; and forming a capping layer on and over the multilayer stack for protecting the multilayer stack by reducing oxidation and mechanical erosion.

2. The method as claimed in claim 1, wherein forming the multilayer stack includes forming the second reflective layer having the lower amorphous molybdenum layer having a thickness of less than 2.5 nanometers and the upper amorphous molybdenum layer having a thickness of less than 2.5 nanometers.

3. The method as claimed in claim 1, wherein forming the multilayer stack includes forming the preventative layer between the lower amorphous molybdenum layer and the upper amorphous molybdenum layer for preventing crystallization of the lower amorphous molybdenum layer and the upper amorphous molybdenum layer.

4. The method as claimed in claim 1, wherein forming the multilayer stack includes forming the preventative layer formed from carbon, ruthenium, niobium, nitrogen, molybdenum carbide, ruthenium molybdenum, boron, or boron carbide.

5. The method as claimed in claim 1, wherein forming the multilayer stack includes forming the preventative layer by injecting carbon into a continuous stream of molybdenum to form an atomic mixture of carbon and molybdenum on the lower amorphous molybdenum layer.

6. The method as claimed in claim 1, wherein forming the multilayer stack includes forming the preventative layer directly on the lower amorphous molybdenum layer and forming the upper amorphous molybdenum layer directly on the preventative layer.

7. The method as claimed in claim 1, wherein forming the multilayer stack includes forming between 20 and 60 of the reflective layer pairs.

8. An extreme ultraviolet reflective element comprising: a substrate; a multilayer stack on the substrate, the multilayer stack includes a plurality of reflective layer pairs having a first reflective layer formed from silicon and a second reflective layer having a preventative layer separating a lower amorphous molybdenum layer and an upper amorphous molybdenum layer; and a capping layer on and over the multilayer stack for protecting the multilayer stack by reducing oxidation and mechanical erosion.

9. The extreme ultraviolet reflective element as claimed in claim 8, wherein the second reflective layer includes the lower amorphous molybdenum layer having a thickness of less than 2.5 nanometers and the upper amorphous molybdenum layer having a thickness of less than 2.5 nanometers.

10. The extreme ultraviolet reflective element as claimed in claim 8, wherein the multilayer stack includes the preventative layer between the lower amorphous molybdenum layer and the upper amorphous molybdenum layer for preventing crystallization of the lower amorphous molybdenum layer and the upper amorphous molybdenum layer.

11. The extreme ultraviolet reflective element as claimed in claim 8, wherein the multilayer stack includes the preventative layer formed from carbon, ruthenium, niobium, nitrogen, molybdenum carbide, ruthenium molybdenum, boron, or boron carbide.

12. The extreme ultraviolet reflective element as claimed in claim 8, wherein the multilayer stack includes the preventative layer formed from an atomic mixture of carbon and molybdenum on the lower amorphous molybdenum layer.

13. The extreme ultraviolet reflective element as claimed in claim 8, wherein the multilayer stack includes the preventative layer directly on the lower amorphous molybdenum layer and the upper amorphous molybdenum layer directly on the preventative layer.

14. The extreme ultraviolet reflective element as claimed in claim 8, wherein the multilayer stack includes between 20 and 60 of the reflective layer pairs.

15. An extreme ultraviolet reflective element lithography system comprising: an extreme

ultraviolet light source which produces extreme ultraviolet light; a reflective element that can reflect the extreme ultraviolet light, the reflective element including a multilayer stack on a substrate, the multilayer stack including a plurality of reflective layer pairs having a first reflective layer formed from silicon and a second reflective layer having a preventative layer separating a lower amorphous molybdenum layer and an upper amorphous molybdenum layer; and a second deposition system for forming a capping layer on the multilayer stack for protecting the multilayer stack by reducing oxidation and mechanical erosion.

16. The system as claimed in claim 15, wherein the lower amorphous molybdenum layer has a thickness of less than 2.5 nanometers and the upper amorphous molybdenum layer has a thickness of less than 2.5 nanometers.

17. The system as claimed in claim 15, wherein the preventative layer between the lower amorphous molybdenum layer and the upper amorphous molybdenum layer prevents crystallization of the lower amorphous molybdenum layer and the upper amorphous molybdenum layer.

18. The system as claimed in claim 15, the preventative layer is selected from carbon, ruthenium, niobium, nitrogen, molybdenum carbide, ruthenium molybdenum, boron, or boron carbide.

19. The system as claimed in claim 15, the preventative layer comprising a mixture of carbon and molybdenum.

20. The system as claimed in claim 15, the preventative layer directly on the lower amorphous molybdenum layer and the upper amorphous molybdenum layer directly on the preventative layer.