

What is claimed is:

1. A method of manufacturing an extreme ultraviolet (EUV) mask blank, the method comprising:
 - 5 placing a substrate in a multi-cathode physical vapor deposition (PVD) chamber including a chamber interior, the PVD chamber comprising at least two targets, a first molybdenum target and second molybdenum target;
forming a multilayer stack of alternating layers of molybdenum and silicon;
removing the substrate from the multi-cathode PVD chamber; and
 - 10 passivating the chamber interior with an active gas to reduce flaking of silicon material from the chamber interior.
2. The method of claim 1, wherein the active gas is selected from oxygen and nitrogen.
- 15 3. The method of claim 1, wherein the active gas comprises oxygen.
4. The method of claim 1, wherein the active gas comprises nitrogen.
- 20 5. The method of claim 2, further comprising activating the active gas with a remote plasma source to create radicals or ions from the active gas.
6. The method of claim 2, further comprising activating the gas with a microwave source to create radicals or ions from the active gas.
- 25 7. The method of claim 6, further comprising controlling pressure in the PVD chamber.
8. The method of claim 6, further comprising flowing the active gas through an inlet and evacuating the gas from the PVD chamber with a pump.
- 30 9. A method of passivating an interior of a multi-cathode physical vapor deposition (PVD) chamber, the method comprising:

- placing a substrate in the multi-cathode physical vapor deposition (PVD) chamber including a chamber interior, the PVD chamber comprising at least two targets, a first molybdenum target and second molybdenum target;
- forming a multilayer stack of alternating layers of molybdenum and silicon;
- 5 removing the substrate from the multi-cathode PVD chamber; and
- passivating the chamber interior by forming a SiO_x passivation layer on the chamber interior.
- 10 10. The method of claim 9, wherein forming the SiO_x passivation layer on the chamber interior comprises flowing O_2 in a range of 5-30 sccm into the PVD chamber to achieve a PVD chamber pressure in a range of 0.3-3 mTorr.
- 15 11. The method of claim 9, wherein forming the SiO_x passivation layer on the chamber interior comprises flowing O_2 in a range of 5-30 sccm into the PVD chamber to achieve a PVD chamber pressure in a range of 0.3-3 mTorr and applying a microwave frequency in a range of 1-10GHz under a power in range of 300-1500W is applied to create a downstream plasma and form the SiO_x passivation layer on the chamber interior.
- 20 12. The method of claim 11, wherein the microwave frequency is applied for a dwell time in a range of 10-30 mins.
- 25 13. The method of claim 9, wherein forming the SiO_x passivation layer on the chamber interior comprises flowing O_2 in a range of 5-30 sccm into the PVD chamber to achieve a PVD chamber pressure in a range of 0.3-3 mTorr, using a remote plasma source (RPS) to apply a plasma in the chamber with radio frequency of 13.56MHz at a power in a range of 200-1500W to form the SiO_x passivation layer on the chamber interior.
- 30 14. The method of claim 13, wherein the plasma is applied for a dwell time in a range of 10-30 mins.

15. A method of passivating an interior of a multi-cathode physical vapor deposition (PVD) chamber, the method comprising:
- placing a substrate in the multi-cathode physical vapor deposition (PVD) chamber including a chamber interior, the PVD chamber comprising at least two
- 5 targets, a first molybdenum target and second molybdenum target;
- forming a multilayer stack of alternating layers of molybdenum and silicon;
- removing the substrate from the multi-cathode PVD chamber; and
- passivating the chamber interior by forming a SiN_x passivation layer on the chamber interior.
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16. The method of claim 15, wherein forming the SiN_x passivation layer on the chamber interior comprises flowing O_2 in a range of 5-30 sccm into the PVD chamber to achieve a PVD chamber pressure in a range of 0.3-3 mTorr.
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17. The method of claim 15, wherein forming the SiN_x passivation layer on the chamber interior comprises flowing N_2 in a range of 5-30 sccm into the PVD chamber to achieve a PVD chamber pressure in a range of 0.3-3 mTorr and applying a microwave frequency in a range of 1-10GHz under a power in range of 300-1500W is applied to create a downstream plasma and form the SiN_x passivation layer on the
- 20 chamber interior.
18. The method of claim 17, wherein the microwave frequency is applied for a dwell time in a range of 10-30 mins.
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19. The method of claim 9, wherein forming the SiN_x passivation layer on the chamber interior comprises flowing N_2 in a range of 5-30 sccm into the PVD chamber to achieve a PVD chamber pressure in a range of 0.3-3 mTorr, using a remote plasma source (RPS) to apply a plasma in the chamber with radio frequency of 13.56MHz at a power in a range of 200-1500W to form the SiN_x passivation layer on the chamber
- 30 interior.
20. The method of claim 14, wherein the plasma is applied for a dwell time in a range of 10-30 mins.