

CLAIMS

What is claimed:

1. A photoresist metrology target comprising:
a first target structure formed from a photoresist material, wherein the first target structure is formed within at least one of a first area and a third area of a first layer of a sample, the first target structure comprising a plurality of first cells containing one or more first cell pattern elements; and
a second target structure formed from a photoresist material, wherein the second target structure is formed within at least one of a second area and a fourth area of a second layer of the sample, the second target structure comprising a plurality of second cells containing one or more second cell pattern elements.
2. The metrology target of Claim 1, wherein the first target structure is two-fold rotationally symmetric to the second target structure about a common center of rotational symmetry on the sample.
3. The metrology target of Claim 2, wherein the plurality of first cells comprises one or more first periodically patterned grids, and wherein the one or more first periodically patterned grids include the one or more first cell pattern elements.
4. The metrology target of Claim 2, wherein the plurality of second cells comprises one or more second periodically patterned grids, and wherein the one or more second periodically patterned grids include the one or more second cell pattern elements.
5. The metrology target of Claim 1, wherein the one or more first cell pattern elements are compatible with an optical metrology mode.
6. The metrology target of Claim 1, wherein the one or more second cell pattern elements are compatible with an optical metrology mode.

7. A system comprising:

a controller communicatively couplable to one or more metrology sub-systems, wherein the controller including one or more processors, wherein the one or more processors are configured to execute a set of program instructions maintained in memory, wherein the set of program instructions is configured to cause the one or more processors to:

receive, from the one or more metrology sub-systems, one or more signals indicative of illumination emanating from one or more metrology targets of a sample, wherein the one or more metrology targets of the sample comprise: a first target structure formed from a photoresist material, wherein the first target structure is formed within at least one of a first area and a third area of a first layer of a sample, the first target structure comprising a plurality of first cells containing one or more first cell pattern elements; and a second target structure formed from a photoresist material, wherein the second target structure is formed within at least one of a second area and a fourth area of a second layer of the sample, the second target structure comprising a plurality of second cells containing one or more second cell pattern elements;

generate one or more first overlay measurements based on one or more signals indicative of illumination emanating from one or more portions of the first target structure;

generate one or more second overlay measurements based on one or more signals indicative of illumination emanating from one or more portions of the second target structure; and

determine an overlay value of the sample based on the one or more first overlay measurements and the one or more second overlay measurements.

8. The system of Claim 7, wherein the generating one or more first overlay measurements based on one or more signals indicative of illumination emanating from one or more portions of the first target structure comprises:

determining, based on the one or more first overlay measurements, one or more first layer centers of gravity.

9. The system of Claim 8, wherein the generating one or more second overlay measurements based on one or more signals indicative of illumination emanating from one or more portions of the second target structure comprises:

determining, based on the one or more second overlay measurements, one or more second layer centers of gravity.

10. The system of Claim 9, wherein the determining an overlay value of the sample based on the one or more first overlay measurements and the one or more second overlay measurements comprises:

computing a difference between the one or more first layer centers of gravity and the one or more second layer centers of gravity.

11. The system of Claim 7, wherein the first target structure is two-fold rotationally symmetric to the second target structure about a common center of rotational symmetry on the sample.

12. The system of Claim 11, wherein the plurality of first cells comprises one or more first periodically patterned grids, and wherein the one or more first periodically patterned grids include the one or more first cell pattern elements.

13. The system of Claim 11, wherein the plurality of second cells comprises a second plurality of periodically patterned grids, and wherein the second plurality of periodically patterned grids includes the one or more second cell pattern elements.

14. The system of Claim 7, wherein the one or more first cell pattern elements are compatible with an optical metrology mode.

15. The system of Claim 7, wherein the one or more second cell pattern elements are compatible with an optical metrology mode.

16. A method of measuring overlay of a sample, comprising:

illuminating a sample including one or more metrology targets, the one or more metrology targets comprising: a first target structure formed from a photoresist material, wherein the first target structure is formed within at least one of a first area and a third area of a first layer of a sample, the first target structure comprising a plurality of first cells containing one or more first cell pattern elements; and a second target structure formed from a photoresist material, wherein the second target structure is formed within at least one of a second area and a fourth area of a second layer of the sample, the second target structure comprising a plurality of second cells containing one or more second cell pattern elements;

detecting illumination emanating from the one or more metrology targets of the sample;

generating one or more first overlay measurements based on one or more signals indicative of illumination emanating from one or more portions of the first target structure;

generating one or more second overlay measurements based on one or more signals indicative of illumination emanating from one or more portions of the second target structure; and

determining an overlay value of the sample based on the one or more first overlay measurements and the one or more second overlay measurements.

17. The method of Claim 16, wherein the generating one or more first overlay measurements based on one or more signals indicative of illumination emanating from one or more portions of the first target structure comprises:

determining, based on the one or more first overlay measurements, one or more first layer centers of gravity.

18. The method of Claim 17, wherein the generating one or more second overlay measurements based on one or more signals indicative of illumination emanating from one or more portions of the second target structure comprises:

determining, based on the one or more second overlay measurements, one or more second layer centers of gravity.

19. The method of Claim 16, wherein the determining an overlay value of the sample based on the one or more first overlay measurements and the one or more second overlay measurements comprises:

computing a difference between the one or more first layer centers of gravity to the one or more second layer centers of gravity.

20. The method of Claim 16, wherein the first target structure is two-fold rotationally symmetric to the second target structure about a common center of rotational symmetry on the sample.

21. The method Claim 20, wherein the plurality of first cells comprises one or more first periodically patterned grids, and wherein the one or more first periodically patterned grids include the one or more first cell pattern elements.

22. The method of Claim 20, wherein the plurality of second cells comprises one or more second periodically patterned grids, and wherein the one or more second periodically patterned grids include the one or more second cell pattern elements.

23. The method of Claim 16, wherein the one or more first cell pattern elements are compatible with an optical metrology mode.

24. The method of Claim 16, wherein the one or more second cell pattern elements are compatible with an optical metrology mode.

25. A method of forming a metrology target comprising:

forming a first target structure from a photoresist material, wherein the first target structure is formed within at least one of a first area and a third area of a first layer of a

sample, the first target structure comprising a plurality of first cells containing one or more first cell pattern elements; and

forming a second target structure from a photoresist material, wherein the second target structure is formed within at least one of a second area and a fourth area of a second layer of the sample, the second target structure comprising a plurality of second cells containing one or more second cell pattern elements.

26. The method of Claim 25, wherein the first target structure is two-fold rotationally symmetric to the second target structure about a common center of rotational symmetry on the sample.

27. The method of Claim 26, wherein the plurality of first cells comprises one or more first periodically patterned grids, and wherein the one or more first periodically patterned grids include the one or more first cell pattern elements.

28. The method of Claim 26, wherein the plurality of second cells comprises one or more second periodically patterned grids, and wherein the one or more second periodically patterned grids include the one or more second cell pattern elements.

29. The method of Claim 25, wherein the one or more first cell pattern elements are compatible with an optical metrology mode.

30. The method of Claim 25, wherein the one or more second cell pattern elements are compatible with an optical metrology mode.