

CLAIMS:

1. A semiconductor wafer imaging system for imaging a semiconductor wafer, the system comprising:

shroud panels defining a black box;

a camera positioned in the black box for imaging the semiconductor wafer;

a flat mirror to reflect diffuse light to the camera; and

an illumination panel for directing the diffuse light to the semiconductor wafer, wherein a portion of the diffuse light is reflected off the semiconductor wafer and the camera images the semiconductor wafer by detecting the reflected diffuse light.

2. The system of claim 1, further comprising a controller for analyzing images generated by the camera, wherein the controller detects defects in the semiconductor wafer.

3. The system of claim 2, wherein the shroud panels include black anodized aluminum panels to minimize reflections in the black box.

4. The system of claim 3, wherein the shroud panels define an upper chamber and a lower chamber, a support plate separates the upper chamber from the lower chamber, a bottom shroud panel at least partially defines the lower chamber and defines a wafer opening, the support plate defines a camera opening, wherein the diffuse light is transmitted to the semiconductor wafer through the wafer opening, and wherein the reflected diffuse light is transmitted from the semiconductor wafer to the camera through the wafer opening and the camera opening.

5. The system of claim 4, wherein the illumination panel is positioned in the lower chamber.

6. The system of claim 5, further comprising an end effector to position the semiconductor wafer in the wafer opening.

7. The system of claim 6, further comprising an end effector positioner attached to the black box for calibrating a position of the end effector, wherein the end effector positioner is detachable from the black box after the position of the end effector has been calibrated.

8. The system of claim 4, wherein the camera and the flat mirror are positioned in the upper chamber.

9. The system of claim 8, further comprising a slide lock attached to the camera for positioning the camera in the upper chamber.

10. The system of claim 8, further comprising a mirror positioning system attached to the flat mirror for positioning the flat mirror in the upper chamber.

11. The system of claim 10, wherein a filter is positioned in the upper chamber and covers the camera opening.

12. The system of claim 8, wherein a filter is attached to the camera and covers a lens of the camera.

13. The system of claim 1, further comprising a locating plate attached to the black box for positioning the black box.

14. A black box for imaging a semiconductor wafer, the black box comprising:

shroud panels defining an upper chamber and a lower chamber, a support plate separates the upper chamber from the lower chamber, a bottom shroud panel at least partially defines the lower chamber and defines a wafer opening, the support plate defines a camera opening;

a camera positioned in the upper chamber for imaging the semiconductor wafer; and

an illumination panel for directing diffuse light to the semiconductor wafer, wherein the diffuse light is transmitted to the semiconductor wafer through the wafer opening, and wherein a portion of the diffuse light is reflected off the semiconductor wafer through the wafer opening and the camera opening and the camera images the semiconductor wafer by detecting the reflected diffuse light.

15. The black box of claim 14, wherein the diffuse light is transmitted to the semiconductor wafer through the wafer opening, and wherein the reflected diffuse light is transmitted from the semiconductor wafer to the camera through the wafer opening and the camera opening.

16. The black box of claim 14, wherein the illumination panel is positioned in the lower chamber.

17. The black box of claim 14, wherein the camera and a flat mirror are positioned in the upper chamber.

18. The black box of claim 17, further comprising a slide lock attached to the camera for positioning the camera in the upper chamber.

19. The black box of claim 17, further comprising a mirror positioning system attached to the flat mirror for positioning the flat mirror in the upper chamber.

20. The black box of claim 14, wherein a filter is attached to the camera and covers a lens of the camera.