What is claimed is:

1. A polishing apparatus comprising:

a polishing pad having a polishing surface;

a polishing head configured to press a workpiece against the polishing surface;

a transparent window disposed in the polishing pad;

a polishing table configured to support the polishing pad;

an optical sensor head located below the transparent window and configured to direct light to the workpiece through the transparent window and receive reflected light from the workpiece through the transparent window;

a cooling device configured to cool a space between the transparent window and the optical sensor head; and

an operation controller configured to control a cooling operation of the cooling device,

wherein the operation controller is configured to calculate a temperature difference by subtracting a temperature in the space from a temperature of the polishing surface, and control the cooling operation of the cooling device such that the temperature difference is maintained not less than a threshold value.

2. The polishing apparatus according to claim 1, wherein the cooling device has a cooling surface exposed in the space.

3. The polishing apparatus according to claim 1, wherein the operation controller is configured to instruct the cooling device to start the cooling operation after polishing of the workpiece.

4. The polishing apparatus according to claim 1, wherein the operation controller is configured to instruct the cooling device to start the cooling operation during polishing of the

workpiece.

5. The polishing apparatus according to claim 1, further comprising a dehumidifying device configured to reduce humidity in the space.

6. A polishing apparatus comprising:

a polishing pad having a polishing surface;

a pure-water supply nozzle configured to supply pure water onto the polishing surface of the polishing pad;

a polishing head configured to press a workpiece against the polishing surface;

a transparent window disposed in the polishing pad;

a polishing table configured to support the polishing pad;

an optical sensor head located below the transparent window and configured to direct light to the workpiece through the transparent window and receive reflected light from the workpiece through the transparent window;

a cooling device configured to cool a space between the transparent window and the optical sensor head; and

an operation controller configured to control a cooling operation of the cooling device,

wherein the operation controller is configured to instruct the cooling device to start the cooling operation after polishing of the workpiece and before or at the same time as the pure-water supply nozzle supplies the pure water onto the polishing surface.

7. A polishing method comprising:

polishing a workpiece by pressing the workpiece against a polishing surface of a polishing pad;

during polishing of the workpiece, directing light from an optical sensor head to the workpiece through a transparent window disposed in the polishing pad, and receiving

reflected light from the workpiece through the transparent window by the optical sensor head;

calculating a temperature difference by subtracting a temperature in a space between the transparent window and the optical sensor head from a temperature of the polishing surface; and

cooling the space by a cooling device such that the temperature difference is maintained not less than a threshold value.

8. The polishing method according to claim 7, wherein the cooling device has a cooling surface exposed in the space.

9. The polishing method according to claim 7, wherein cooling of the space by the cooling device is started after polishing of the workpiece.

10. The polishing method according to claim 7, wherein cooling of the space by the cooling device is started during polishing of the workpiece.

11. The polishing method of claim 7, further comprising reducing humidity in the space.

12. A polishing method comprising:

polishing a workpiece by pressing the workpiece against a polishing surface of a polishing pad;

during polishing of the workpiece, directing light from an optical sensor head to the workpiece through a transparent window disposed in the polishing pad, and receiving reflected light from the workpiece through the transparent window by the optical sensor head;

after polishing of the workpiece, supplying pure water onto the polishing surface of the polishing pad from a pure-water supply nozzle; and

cooling a space between the transparent window and the optical sensor head by a

cooling device after polishing of the workpiece and before or at the same time as the pure water is supplied onto the polishing surface from the pure-water supply nozzle.