CLAIMS:

1. A method of preheating a polishing pad of a semiconductor wafer polishing system, the method comprising:

heating a first fluid to a first predetermined temperature;

applying the first fluid to the polishing pad;

rotating the polishing pad such that the first fluid covers the polishing pad;

varying, by a flow controller while applying the first fluid to the polishing pad, a flow rate of the first fluid to the polishing pad based on a measured temperature of the polishing pad to increase a temperature of the polishing pad to a second predetermined temperature, the second predetermined temperature being based on a thermal steady state temperature that is achieved when the wafer is polished to a targeted shape and flatness; and

applying a second fluid to the polishing pad for polishing the wafer.

2. The method of claim 1, wherein the first predetermined temperature is calculated based on the second predetermined temperature and the polishing pad temperature.

3. The method of claim 1, wherein the polishing pad temperature is maintained between 42 °C and 43 °C.

4. The method of claim 1, wherein applying the first fluid to the polishing pad includes channeling the first fluid to the polishing pad for a predetermined time, and wherein the method further comprises varying the

predetermined time based on a measured temperature of the polishing pad.

5. The method of claim 1, wherein the first fluid includes deionized water and is substantially free of silicon dioxide.

6. The method of claim 1, further comprising: using a heater to heat the first fluid to the first predetermined temperature; and varying a temperature of the first fluid based on a measured temperature of the polishing pad.

7. A method of polishing a semiconductor wafer with a wafer polishing system, the wafer polishing system including a preheating system and a polishing head, the preheating system including a heater, the polishing head including a polishing pad, the method comprising:

heating a first fluid to a first predetermined temperature with the heater;

applying the first fluid to the polishing pad;

rotating the polishing pad such that the first fluid covers the polishing pad;

varying, by a flow controller while applying the first fluid to the polishing pad, a flow rate of the first fluid to the polishing pad based on a measured temperature of the polishing pad to increase a temperature of the polishing pad to a second predetermined temperature, the second predetermined temperature being based on a thermal steady state temperature that is achieved when the wafer is polished to a targeted shape and flatness;

placing the wafer in the wafer polishing system;

applying a second fluid to the polishing pad; and

polishing the wafer with the polishing pad and the second fluid.

8. The method of claim 7, wherein the second fluid comprises a slurry.

9. The method of claim 8, wherein friction between the polishing pad, the wafer, and the slurry maintains the polishing pad temperature at the second predetermined temperature.

10. A wafer polishing system for polishing a semiconductor wafer, the wafer polishing system comprising:

a polishing head comprising a polishing pad; and

a preheating system for preheating the polishing pad, the preheating system comprising a heater for heating a first fluid to a first predetermined temperature, wherein the preheating system channels the first fluid to the polishing pad; and

a controller that controls the preheating system and the polishing head, wherein the controller is programmed to:

cause the preheating system to apply the first fluid to the polishing pad for a predetermined period of time by:

varying, while applying the first fluid to the polishing pad, a flow rate of the first fluid to the polishing pad based on a measured temperature of the polishing pad to raise a polishing pad temperature to a second predetermined temperature, the second predetermined temperature being based

on a thermal steady state temperature that is achieved when the wafer is polished to a targeted shape and flatness; and

rotating the polishing pad such that the first fluid covers the polishing pad; and

cause a second fluid to be applied to the polishing pad, the second fluid being used for polishing of the wafer.

11. The wafer polishing system of claim 10, wherein the first predetermined temperature is calculated based on the second predetermined temperature and the polishing pad temperature.

12. The wafer polishing system of claim 10, wherein the polishing head comprises a plate attached to the polishing pad, the plate defines a fluid distribution tube for channeling the first fluid from the preheating system to the polishing pad and for channeling the second fluid from a supply system to the polishing pad.

13. The wafer polishing system of claim 10, wherein the preheating system further comprises a polishing pad temperature sensor for measuring a polishing pad temperature.

14. The wafer polishing system of claim 10, wherein the preheating system further comprises a flow controller for controlling a flow rate of the first fluid.