CLAIMS

1. A method for polishing semiconductor substrates, each substrate having a front surface and a back surface generally parallel to the front surface, the method comprising:

contacting the front surface of a first semiconductor substrate with a polishing pad;

supplying a first semiconductor substrate polishing slurry to the polishing pad to finish polish the front surface of the first semiconductor substrate and produce a polished first semiconductor substrate;

measuring the edge roll-off of the first semiconductor substrate;

contacting the front surface of a second semiconductor substrate with the polishing pad;

supplying a second semiconductor substrate polishing slurry to the polishing pad to finish polish the front surface of the second semiconductor substrate; and

controlling an amount of the second semiconductor substrate polishing slurry supplied to the polishing pad while contacting the second semiconductor substrate with the polishing pad based on, at least in part, the measured edge roll-off of the first semiconductor substrate.

2. The method as set forth in claim 1 wherein the first semiconductor substrate is one of a batch of semiconductor substrates, the method comprising:

contacting the front surface of each semiconductor substrate of the batch of semiconductor substrates with the polishing pad;

supplying the first semiconductor substrate polishing slurry to the polishing pad for each semiconductor substrate of the batch to finish polish the front surface of each of the semiconductor substrates of the batch to produce a batch of polished semiconductor substrates;

measuring the edge roll-off of each of the polished semiconductor substrates of the batch; and

controlling the amount of the second semiconductor substrate polishing slurry supplied to the polishing pad while contacting the second semiconductor substrate with the polishing pad based on, at least in part, the measured edge roll-off of the batch of polished semiconductor substrates.

3. The method as set forth in claim 2 wherein the measured edge roll-off of each of the polished semiconductor substrates of the batch is averaged, the amount of the second semiconductor substrate polishing slurry supplied to the polishing pad while contacting the second semiconductor substrate with the polishing pad being based on, at least in part, the averaged roll-off amount of the batch.

4. The method as set forth in claim 3 further comprising comparing the average edge roll-off of the batch of semiconductor substrates to an average edge roll-off of polishing pads that are the same as the polishing pad used to polish the first semiconductor substrate to determine a pad-to-pad variance of the polishing pad.

5. The method as set forth in claim 2 wherein the batch comprises at least 5 semiconductor substrates.

6. The method as set forth in claim 1 wherein the amount of the second semiconductor substrate polishing slurry supplied to the polishing pad while contacting the second semiconductor substrate with the polishing pad is controlled based on, at least in part, the lifetime of the polishing pad.

7. The method as set forth in claim 1 wherein the amount of the second semiconductor substrate polishing slurry supplied to the polishing pad while contacting the second semiconductor substrate with the polishing pad is controlled based on, at least in part, the flatness of the second semiconductor substrate.

8. The method as set forth in claim 1 wherein the second semiconductor substrate polishing slurry is supplied in at least two steps, the second semiconductor substrate polishing slurry being a first step polishing slurry comprising silica, the first step polishing slurry being supplied to the polishing pad at a first step polishing slurry volume, the method further comprising:

supplying a second step polishing slurry to the polishing pad at a second step polishing slurry volume, the first step polishing slurry comprising a higher concentration of silica relative to the second step polishing slurry, wherein the amount of the first step polishing slurry supplied to the polishing pad is controlled by controlling a ratio of the first step polishing slurry volume to the second step polishing slurry volume.

9. The method as set forth in claim 8 wherein the second step polishing slurry comprises silica.

10. The method as set forth in claim 8 wherein the ratio of the first step polishing slurry volume to the second step polishing slurry volume is controlled by controlling the time at which the first step polishing slurry and second step polishing slurry are applied to the polishing pad.

11. The method as set forth in claim 8 wherein the first step polishing slurry and the second step polishing slurry are separately supplied to the polishing pad.

12. The method as set forth in claim 1 wherein the amount of second semiconductor polishing slurry supplied to the polishing pad is the total amount of second semiconductor polishing slurry supplied while polishing at a first table of a polishing apparatus, the method comprising transferring the substrate to a second table of the polishing apparatus.

13. The method as set forth in claim 1 wherein the back surfaces of the first and second semiconductor substrates are not contacted with a polishing pad while polishing the front surface of the substrate.

14. The method as set forth in claim 1 wherein:

the finish polish of the first semiconductor substrate removes about 0.5 μm or less of material from the front surface of the first semiconductor substrate; and

the finish polish of the second semiconductor substrate removes about 0.5 μm or less of material from the front surface of the second semiconductor substrate.

15. The method as set forth in claim 1 wherein the first semiconductor substrate is one of the first five, first ten or first twenty substrates polished by the polishing pad.

16. The method as set forth in claim 1 wherein the first semiconductor substrate is the first substrate polished by the polishing pad.

17. The method as set forth in claim 1 wherein the amount of the second semiconductor substrate polishing slurry supplied to the polishing pad while contacting the second semiconductor substrate with the polishing pad is based on, at least in part, the difference between the measured edge roll-off of the first semiconductor substrate and the average edge roll-off of the same polishing pads.