

What is claimed is:

1. A substrate polishing apparatus, comprising:
 - a top ring for pressing a substrate against a polishing pad;
 - a press mechanism that independently presses a plurality of regions of the substrate;
 - a spectrum generating unit that directs light onto a surface of the substrate to be polished, receives reflected light, and calculates a reflectivity spectrum corresponding to the wavelength of the reflected light, the reflectivity spectrum being determined by dividing a measured light intensity by a reference light intensity at the same wavelength as the measured light intensity;
 - a profile signal generating unit that generates a polishing profile of the substrate when reflectivity spectra at a plurality of measurement points on the substrate are input;
 - a pressure control unit that controls pressing forces to be pressed against the plurality of regions of the substrate by the press mechanism based on the polishing profile; and
 - an end detecting unit that detects an end of substrate polishing based on the reflectivity spectrum from the spectrum generating unit and without being based on the polishing profile.
2. The substrate polishing apparatus according to claim 1, wherein

the end detecting unit detects a point of time when an interface with the base layer of a surface of the substrate or a level difference on the surface of the substrate is eliminated.

3. The substrate polishing apparatus according to claim 1, wherein

the profile signal generating unit stores spectrum groups including a plurality of reference spectra corresponding to different film thicknesses, selects a reference spectrum having a form closest to the reflectivity spectrum from the spectrum generating unit, and estimates a film thickness corresponding to the reference spectrum to be the film thickness of a wafer being polished.

4. The substrate polishing apparatus according to claim 1, wherein

in the profile signal generating unit, a reflectivity spectrum from the spectrum generating unit is subjected to a Fourier transform process to determine a thickness of a wafer and an intensity of a frequency component corresponding to the thickness and estimate the film thickness of the wafer based on a peak of the determined spectrum.

5. The substrate polishing apparatus according to claim 1, wherein

the profile signal generating unit extracts an extreme point indicating a wavelength having a maximum value or a minimum

value for the reflectivity spectrum from the spectrum generating unit to estimate the film thickness of a wafer based on an amount of change in the extreme point with the polishing of the substrate.

6. The substrate polishing apparatus according to claim 1, wherein

the reflectivity spectrum from the spectrum generating unit is input to the end detecting unit.

7. The substrate polishing apparatus according to claim 6, wherein

the end detecting unit calculates indexes which are set with reference to two predetermined wavelengths, of reflectivity spectra from the spectrum generating unit, and calculates a polishing amount by detecting the maximum value of an index in a temporal change.

8. The substrate polishing apparatus according to claim 6, wherein

the end detecting unit sums temporal change in reflectivity spectra from the spectrum generating unit to determine a cumulative amount of change in spectrum, and determines termination of the polishing at a time point when the cumulative amount of change in spectrum reaches a predetermined value.

9. A substrate polishing method for polishing a surface of a substrate by a polishing pad, a plurality of regions of the substrate capable of being independently pressed by a press mechanism, the method including the steps of:

directing light onto a surface of the substrate of interest for polishing, receiving reflected light, and calculating a reflectivity spectrum corresponding to a wavelength of the reflected light, the reflectivity spectrum being determined by dividing a measured light intensity by a reference light intensity at the same wavelength as the measured light intensity;

generating a polishing profile of the substrate when reflectivity spectra at a plurality of measurement points on the substrate are input;

controlling pressing forces to be pressed against the plurality of regions of the substrate by the press mechanism based on the polishing profile; and

detecting an end of substrate polishing without being based on the polishing profile.