WHAT IS CLAIMED IS:

1. A method for online inspection of a surface condition of a polishing pad, characterized in that, comprising the following steps:

moving an optical sensor above the polishing pad to obtain a distance information between the optical sensor and the surface of the polishing pad;

analyzing distribution of the liquid on the surface of the polishing pad based on the distance information, and calculating depths of the grooves on the surface of the polishing pad using different modified calculation formulas; and

comparing the depths of the grooves on the surface of the polishing pad with a predetermined threshold value, and determining whether the polishing pad needs to be replaced or reworked,

a distance between the optical sensor and the surface of the polishing pad acquired during movement of the optical sensor is used as a first information;

or/and a distance between the optical sensor and a surface of the liquid on the polishing pad acquired during movement of the optical sensor is used as a second information;

or/and a distance between the optical sensor and a bottom surface of the grooves acquired during movement of the optical sensor is used as a third information;

or/and a distance between the optical sensor and a liquid surface in the grooves acquired during movement of the optical sensor is used as fourth information,

distribution patterns of the liquid on the surface of the polishing pad comprise at least one of the following three cases:

in a first case, the liquid is present in the grooves, and overflows to cover the surface of the polishing pad;

in a second case, the liquid is present in the grooves, but the grooves are not completely filled; and

in a third case, the liquid is not present in the grooves,

in the first case, the first information, the second information, the third information and the

fourth information are acquired;

in the second case, the first information, the third information and the fourth information are acquired; and

in the third case, the first information and the third information are acquired.

2. The method for online inspection of the surface condition of the polishing pad according to Claim 1, characterized in that, comparing the depths of the grooves on the surface of the polishing pad with a predetermined threshold value is to determine whether number of the grooves with the depths of the grooves less than the predetermined threshold value reaches a set number, or to determine whether an average value of the depths of the grooves in a specified range is less than the predetermined threshold value.

3. The method for online inspection of the surface condition of the polishing pad according to Claim 1, characterized in that,

in the first case, the depths of the grooves = the measured depths of the grooves × liquid refractive index;

in the second case, the depths of the grooves = the measured depths of the grooves + (the distance between the optical sensor and the bottom surface of the grooves - the distance between the optical sensor and the liquid surface in the grooves) × (liquid refractive index-1); and

in the third case, the depths of the grooves = the measured depths of the grooves.

4. The method for online inspection of the surface condition of the polishing pad according to Claim 1, characterized in that, the above steps are repeated, and when the depths of the grooves reach a predetermined condition, a warning for replacing the polishing pad is given.

5. The method for online inspection of the surface condition of the polishing pad according to Claim 1, characterized in that, the optical sensor moves above the polishing pad in a direction which is parallel to the polishing pad, from a periphery of the polishing pad to a center of the polishing pad.

6. A system for online inspection of a surface condition of a polishing pad applying the

method for online inspection of the surface condition of the polishing pad according to any one of Claims 1 to 5, characterized in that, comprising:

an optical sensor at least comprising an optical unit, a sensor probe and a control unit,

the optical unit being used for emitting a light beam to a surface of the polishing pad,

the sensor probe being used for focusing the light beam emitted by the optical unit and shining the light beam on the polishing pad, and receiving a reflected light signal and transmitting the reflected light signal to the optical unit,

the control unit being used for acquiring the distance information between the sensor probe and the surface of the polishing pad;

a processing unit connected with the optical sensor and used for analyzing the distance information between the sensor probe and the surface of the polishing pad and calculating depths of the grooves on the surface of the polishing pad according to different modified calculation formulas; and

a movable support structure used for driving the optical sensor to move above the polishing pad.

7. The system for online inspection of the surface condition of the polishing pad according to Claim 6, characterized in that, the optical sensor adopts a spectral confocal technology.

8. The system for online inspection of the surface condition of the polishing pad according to Claim 6, characterized in that, the movable support structure drives the optical sensor to move in a direction which is mostly parallel to the polishing pad, from a periphery to a center of the polishing pad, and a height of the movable support structure is adjustable.

9. The system for online inspection of the surface condition of the polishing pad according to Claim 6, characterized in that, the movable support structure is a polishing head, or a polishing arm, or a polishing slurry distribution arm, or a dressing head, or a dressing arm, or an independent support structure.

10. The system for online inspection of the surface condition of the polishing pad according

to Claim 6, characterized in that, the sensor probe is covered with a transparent protective layer, and the system further comprises a cleaning unit for cleaning the sensor probe or the transparent protective layer.

11. The system for online inspection of the surface condition of the polishing pad according to Claim 6, characterized in that, further comprising a warning unit which gives a warning signal when an average value of the depths of the grooves in a specified range is less than a predetermined value or a number of the grooves have the depths of the grooves less than a predetermined threshold value.