WHAT IS CLAIMED IS:

1. A protective film thickness measuring method for measuring a thickness of a protective film formed on a top surface of a wafer having patterns on the top surface, the protective film thickness measuring method comprising:

a pre-protective film formation measuring step of applying light of a first wavelength to the top surface of the wafer in a state in which no protective film is formed and measuring a first reflection intensity of the light reflected from the top surface;

a protective film forming step of forming the protective film including a light absorbing material on the top surface;

a post-protective film formation measuring step of irradiating the protective film with exciting light of a second wavelength at which the light absorbing material fluoresces, and measuring a second reflection intensity including fluorescence of the protective film and the light reflected from the top surface by a measuring unit, wherein the second wavelength is different from the first wavelength;

a protective film fluorescence intensity calculating step of excluding reflection intensity of the

patterns formed on the top surface, by subtracting the first reflection intensity measured in the pre-protective film formation measuring step from the second reflection intensity measured in the post-protective film formation measuring step, and calculating fluorescence intensity of the protective film; and

a protective film thickness identifying step of identifying the thickness of the protective film from correlation data regarding correlation between the fluorescence intensity of the protective film and the thickness of the protective film, the correlation data being obtained in advance, and the calculated fluorescence intensity of the protective film.

2. The protective film thickness measuring method according to claim 1, wherein:

the measuring unit is able to function as an imaging unit,

the pre-protective film formation measuring step images the top surface of the wafer by the imaging unit,

the post-protective film formation measuring step images a top surface of the protective film formed on the top surface of the wafer by the imaging unit, and

the first reflection intensity and the second reflection intensity are respectively measured in

reference to luminance of pixels of respective images obtained by the imaging unit.

3. The protective film thickness measuring method according to claim 1, wherein:

a light source that irradiates the top surface of the wafer with light in the pre-protective film formation measuring step and the post-protective film formation measuring step is a white light source, and

a first filter that transmits only light of a specific wavelength is disposed between the light source and the wafer.

4. The protective film thickness measuring method according to claim 3, wherein:

the light source that irradiates the top surface of the wafer with light in the pre-protective film formation measuring step and the post-protective film formation measuring step is a white light source, and

a second filter that transmits only light of a specific wavelength is disposed between the wafer and the measuring unit.

5. The protective film thickness measuring method according to claim 4, wherein:

the light used during the pre-protective film formation measuring step is passed through the first

filter that only transmits light of the first wavelength therethrough;

in the post-protective film formation measuring step, a first filter member of the first filter is changed to a second filter member, the second filter member different from the first filter member used in the pre-protective film formation measuring step; and

the light used during the post-protective film formation measuring step is passed through the second filter member of the first filter that only transmits light of the second wavelength therethrough.

6. The protective film thickness measuring method according to claim 2, wherein:

where wafers to be processed are of a same lot, and the wafer is a first wafer of a frame unit to be processed,

in the pre-protective film formation measuring step,

a first reflection intensity data table is generated in which respective X-axis and Y-axis coordinate positions in an X-axis and Y-axis plane coordinate system parallel with the top surface of the wafer in a captured image are associated with first reflection intensities measured at the

respective X-axis and Y-axis coordinate positions; and

the first reflection intensity data table is stored to be used in the post-protective film formation measuring step.

7. The protective film thickness measuring method according to claim 6, wherein:

the pre-protective film formation measuring step is performed is performed only for the first wafer; and

when second and subsequent frame units are processed, the first reflection intensity data table is used, so that the pre-protective film formation measuring step does not need to be performed.