

WHAT IS CLAIMED IS:

1. A method of detecting a Facet region of a SiC ingot, the method comprising:

a fluorescence luminance detecting step of detecting fluorescence luminance unique to SiC by irradiating the SiC ingot with exciting light having a predetermined wavelength from a top surface of the SiC ingot; and

a coordinate setting step of setting a region in which the fluorescence luminance is equal to or higher than a predetermined value in the fluorescence luminance detecting step as a non-Facet region, setting a region in which the fluorescence luminance is lower than the predetermined value in the fluorescence luminance detecting step as a Facet region, and setting coordinates of a boundary between the Facet region and the non-Facet region.

2. A wafer producing method for producing a SiC wafer from a SiC ingot, the wafer producing method comprising:

a flat surface forming step of forming a top surface of the SiC ingot into a flat surface by grinding the top surface of the SiC ingot;

a fluorescence luminance detecting step of

detecting fluorescence luminance unique to SiC by irradiating the SiC ingot with exciting light having a predetermined wavelength from the top surface of the SiC ingot;

a coordinate setting step of setting, as an X-axis, a direction orthogonal to a direction in which a c-plane is inclined with respect to the top surface of the SiC ingot and an off angle is formed, setting a direction orthogonal to the X-axis as a Y-axis, setting a region in which the fluorescence luminance is equal to or higher than a predetermined value in the fluorescence luminance detecting step as a non-Facet region, setting a region in which the fluorescence luminance is lower than the predetermined value in the fluorescence luminance detecting step as a Facet region, and setting X-coordinates and Y-coordinates of a boundary between the Facet region and the non-Facet region;

a processing feed step of forming a band-shaped peeling layer in which SiC is separated into Si and C and a crack extends along the c-plane, by positioning a focusing point formed by condensing a laser beam having a wavelength transmissible through SiC by a condenser at a depth corresponding to thickness of a wafer to be produced from the top surface of the SiC ingot, and

processing-feeding the SiC ingot and the focusing point relative to each other in an X-axis direction while irradiating the SiC ingot with the laser beam;

an indexing feed step of arranging band-shaped peeling layers in a Y-axis direction in parallel with each other by indexing-feeding the SiC ingot and the focusing point relative to each other in the Y-axis direction; and

a peeling step of peeling off the wafer to be produced from the peeling layers;

the processing feed step increasing energy of the laser beam and raising a position of the condenser at a time of irradiating the Facet region with the laser beam with respect to the energy of the laser beam and the position of the condenser at a time of irradiating the non-Facet region with the laser beam on a basis of the X-coordinates and the Y-coordinates of the boundary between the Facet region and the non-Facet region, the X-coordinates and the Y-coordinates being set in the coordinate setting step.

~~3. An apparatus for detecting a Facet region of a SiC ingot, the apparatus comprising:~~

~~—fluorescence luminance detecting means detecting fluorescence luminance unique to SiC by irradiating the~~

~~SiC ingot with exciting light having a predetermined wavelength from a top surface of the SiC ingot; and~~
~~coordinate setting means setting a region in which the fluorescence luminance detected by the fluorescence luminance detecting means is equal to or higher than a predetermined value as a non-Facet region, setting a region in which the fluorescence luminance is lower than the predetermined value as a Facet region, and setting coordinates of a boundary between the Facet region and the non-Facet region.~~

~~4. A laser processing apparatus for forming a peeling layer in a SiC ingot, the laser processing apparatus comprising:~~

~~a holding table configured to hold the SiC ingot;~~

~~fluorescence luminance detecting means detecting fluorescence luminance unique to SiC by irradiating the SiC ingot with exciting light having a predetermined wavelength from a top surface of the SiC ingot;~~

~~coordinate setting means setting, as an X-axis, a direction orthogonal to a direction in which a c-plane is inclined with respect to the top surface of the SiC ingot and an off angle is formed, setting a direction orthogonal to the X-axis as a Y-axis, setting a region in which the fluorescence luminance detected by the~~

~~fluorescence luminance detecting means is equal to or higher than a predetermined value as a non-Facet region, setting a region in which the fluorescence luminance is lower than the predetermined value as a Facet region, and setting X-coordinates and Y-coordinates of a boundary between the Facet region and the non-Facet region;~~

~~———— a laser beam irradiating unit including a condenser that forms a peeling layer in which SiC is separated into Si and C and a crack extends along the c-plane, by positioning a focusing point of a laser beam having a wavelength transmissible through SiC at a depth corresponding to thickness of a wafer to be produced from the top surface of the SiC ingot, and irradiating the SiC ingot with the laser beam;~~

~~———— an X-axis feeding mechanism configured to processing-feed the holding table and the condenser relative to each other in an X-axis direction;~~

~~———— a Y-axis feeding mechanism configured to indexing-feed the holding table and the condenser relative to each other in a Y-axis direction; and~~

~~———— a control unit configured to increase energy of the laser beam and raise a position of the condenser at a time of irradiating the Facet region with the laser beam with respect to the energy of the laser beam and the~~

~~position of the condenser at a time of irradiating the
non-Facet region with the laser beam on a basis of the X-
coordinates and Y-coordinates of the boundary between the
Facet region and the non-Facet region.~~