WHAT IS CLAIMED IS:

1. A wafer thinning method for thinning a wafer to a finished thickness formed from an SiC substrate having a first surface, a second surface opposite to said first surface, a c-axis extending from said first surface to said second surface, and a c-plane perpendicular to said c-axis, said first surface of said SiC substrate having a device area where a plurality of devices are formed and a peripheral marginal area surrounding said device area, said wafer thinning method comprising:

providing a wafer formed from an SiC substrate having a first surface, a second surface opposite to said first surface, a c-axis extending from said first surface to said second surface, and a c-plane perpendicular to said c-axis, where said c-plane is set in the SiC substrate at the molecular level, where said c-axis is inclined by an off angle with respect to a normal to said first surface, where said c-axis and said normal to the first surface intersect each other, and thereby said c-plane is inclined by said off angle with respect to the first surface, and said first surface of said SiC substrate having a device area where a plurality of

devices are formed and a peripheral marginal area surrounding said device area;

an annular groove forming step of forming an annular groove on said second surface of said SiC substrate in an annular area corresponding to the boundary between said device area and said peripheral marginal area in a condition where a thickness corresponding to the finished thickness is left;

a separation start point forming step of setting the focal point of a laser beam having a transmission wavelength to said SiC substrate inside said SiC substrate in a central area surrounded by said annular groove at a predetermined depth from said second surface, which depth corresponds to the finished thickness, and next applying said laser beam to said second surface while relatively moving said focal point and said SiC substrate to thereby form a modified layer inside said SiC substrate at said predetermined depth in said central area and also form cracks extending from said modified layer along said c-plane, thus forming a separation start point; and

a wafer thinning step of applying an external force to said wafer after performing said separation start

point forming step, thereby separating said wafer at said separation start point into a first wafer of the finished thickness and having said first surface of said SiC substrate and a second wafer having said second surface of said SiC substrate, and wherein a ring-shaped reinforcing portion is formed on a back side of said first wafer in a peripheral area corresponding to said peripheral marginal area;

said separation start point forming step including:

a modified layer forming step of relatively moving the focal point of said laser beam in a first direction, where the first direction is perpendicular to a second direction, and further wherein said second direction is defined as a direction parallel to a line connecting a point where said c-axis intersects said first surface to a point where said normal intersects said first surface, thereby linearly forming said modified layer extending in said first direction, and

an indexing step of relatively moving said focal point in said second direction to thereby index said focal point by a predetermined amount.

2. The wafer thinning method according to claim 1, further comprising:

a grinding step of grinding the back side of said first wafer having said first surface except said ring-shaped reinforcing portion after performing said wafer thinning step, thereby flattening the back side of said first wafer except said ring-shaped reinforcing portion.

3. The wafer thinning method according to claim 1, wherein said external force of said wafer thinning step comprises applying a torsional stress to said wafer.

4. The wafer thinning method according to claim 2, wherein said external force of said wafer thinning step comprises applying a torsional stress to said wafer.