WHAT IS CLAIMED IS:

1. An SiC wafer producing method for producing an SiC wafer from a single crystal SiC ingot having a first end surface and a second end surface, a c-axis intersecting both said first end surface and said second end surface, a c-plane perpendicular to said c-axis, and a natural frequency, said SiC wafer producing method comprising:

a separation layer forming step of setting a focal point of a laser beam having a transmission wavelength to single crystal SiC inside said SiC ingot at a predetermined depth from said first end surface, said predetermined depth corresponding to a thickness of said SiC wafer to be produced, and next applying said laser beam to said SiC ingot, thereby forming a plurality of modified portions on said c-plane at said predetermined depth and also forming a plurality of cracks isotropically formed on said c-plane so as to extend from each modified portion, each modified portion being a region where SiC has been decomposed into Si and C, said modified portions and said cracks constituting a separation layer along which said SiC wafer is to be separated from said SiC ingot; and

a wafer producing step of, after the separation

layer forming step, separating a part of said SiC ingot along said separation layer as an interface, thereby producing said SiC wafer;

said wafer producing step including the steps of immersing said SiC ingot in a liquid in the condition where said first end surface of said SiC ingot is opposed to an ultrasonic vibrator for generating ultrasonic wave, and next applying said ultrasonic wave from said ultrasonic vibrator through said liquid to said SiC ingot, thereby separating said SiC wafer from said SiC ingot, said ultrasonic wave having a frequency greater than or equal to a critical frequency close to the natural frequency of said SiC ingot;

wherein said critical frequency close to the natural frequency of said SiC ingot is 0.8 times the natural frequency of said SiC ingot;

wherein said c-axis is inclined by an off angle with respect to a normal to said first end surface of said SiC ingot, wherein the c-axis and the normal intersect each other at said second end surface, and thereby the c-plane is inclined by said off angle with respect to said first end surface of said SiC ingot, and

wherein said separation layer forming step includes:

a modified portion forming step of applying

said laser beam to said SiC ingot in the condition where said focal point is set at said predetermined depth as relatively linearly feeding said SiC ingot and said focal point in a first direction perpendicular to a second direction, and where the second direction is defined as a direction parallel to a line connecting a point where the c-axis intersects said first end surface to a point where the normal intersects said first end surface, thereby continuously forming said modified portions so that any adjacent ones of said modified portions overlap each other in said first direction; and

an indexing step of relatively indexing said SiC ingot and said focal point in ~~an~~said second ~~indexing~~ direction by a predetermined amount in the range not greater than the width of said cracks; and

said modified portion forming step and said indexing step being alternately performed to form said separation layer, in which said cracks adjacent to each other in said second~~indexing~~ direction are connected.

2. The SiC wafer producing method according to claim 1, wherein said liquid includes water, the temperature of said water being set to a temperature at which the occurrence of cavitation is suppressed.

3. The SiC wafer producing method according to claim 2, wherein the temperature of said water is in the range of 0° C. to 25° C.

4. The SiC wafer producing method according to claim 1, wherein said ultrasonic vibrator is immersed in the liquid.

5. The SiC wafer producing method according to claim 1, wherein said wafer producing step is performed by a separating apparatus which includes a holding means for holding the SiC ingot;

said holding means including an arm and a suction member fixed to an end of the arm;

said suction member having a surface for holding the SiC ingot under suction from an upper surface of the SiC ingot.