WHAT IS CLAIMED IS:

1. Generation method of semiconductor wafers, comprising:

S1, setting a count of laser scans to n times, wherein n is an integer greater than or equal to 2, setting a scanning path for each laser scan and a point spacing between two adjacent modified points on the scanning path;

S2, determining, based on a predetermined rule for the each laser scan, a laser scanning speed and a laser pulse repetition frequency required to achieve the point spacing and determining a corresponding diameter of a modified point, and determining laser pulse energy required to achieve the diameter of the modified point and an offset distance of a laser focal point relative to a predetermined peeling surface;

S3, performing n times of the laser scans on the predetermined peeling surface inside a crystal ingot on which a pulse laser focuses or below the predetermined peeling surface to form a modified point on the predetermined peeling surface and forming an overlapping region between the modified points formed by at least two laser scans to form a crack extending transversely along the predetermined peeling surface in the overlapping region; and

S4, peeling the crystal ingot along the predetermined peeling surface to obtain a wafer and a remaining ingot;

in S2, the predetermined rule includes predetermined rules for 1st to n′th laser scans, wherein the predetermined rules for the 1st to n′th laser scans include: a point spacing between two adjacent modified points on 1st to n′th scanning paths being positively correlated with 1st to n′th laser scanning speed and negatively correlated with 1st to n′th laser pulse repetition frequency, wherein the point spacing between the two adjacent modified points on the 1st to n′th scanning paths is greater than or equal to 0.7 times of a diameter of a modified point on n′th laser scan, wherein 1st to n′th laser pulse energy is greater than or equal to 1 μJ, an offset distance of 1st to n′th laser focal point relative to the predetermined peeling surface is within a range of 0 μm-5 μm, and n′ is an integer greater than or equal to 1;

the predetermined rule includes predetermined rules for (n′+1)th to n″th laser scans, wherein the predetermined rules for the (n′+1)th to n″th laser scans include: a point spacing between two adjacent modified points on (n′+1)th to n″th scanning paths being positively correlated with (n′+1)th to n″th laser scanning speed and negatively correlated with (n′+1)th to n″th laser pulse repetition frequency, wherein the point spacing between the two adjacent modified points on the (n′+1)th to n″th scanning paths is less than to a diameter of a modified point on (n′+1)th laser scan, wherein (n′+1)th to n″th las

er pulse energy is greater than or equal to 5 μJ, an offset distance of (n′+1)th to n″th laser focal points relative to the predetermined peeling surface is within a range of 0 μm-20 μm, and n″ is an integer gr eater than or equal to 2.

2. The method of claim 1, in S1, the setting a scanning path for each laser scan includes: setting the scanning path for the each laser scan to be a combination path of at least one of a line-by-line sca nning path, a grid-interleaved scanning path, a concentric circle scanning path, and a vortex line scan ning path.

3. The method of claim 2, in S1, the setting a scanning path for each laser scan further includes: controlling a range of a line distance between two scanning segments spaced apart from each other o n the scanning path to be 0.05 mm to 1.00 mm.

4. The method of claim 1, in S2, the predetermined rules for the (n′+1)th to n″th laser scans furth er include: controlling the point spacing between the two adjacent modified points on the (n′+1)th to n″th scanning paths to be within a predetermined multiplier range of 0.2-0.6 times of the diameter of the modified point of the (n′+1)th laser scan.

5. The method of claim 1, in S3, the performing n times of the laser scans includes: controlling a laser wavelength range of the each laser scan to be 780 nm-2500 nm, and a laser pulse width range o f the each laser scan to be 10 fs-100ns.

6. The method of claim 1, in S3, the pulse laser is a pulse string including a plurality of sub-puls es; wherein a time interval between two adjacent sub-pulses is not more than 100 ns.

7. The method of claim 1, in S3, the performing n times of the laser scans includes: performing an aberration correction on the pulse laser in advance before the 1st to n′th laser scans.

8. The method of claim 1, in S3, the performing n times of the laser scans includes: performing beam shaping on the pulse laser in advance before the (n′+1)th to n″th laser scans.