WHAT IS CLAIMED IS:

1. A wafer processing method of processing a wafer having a silicon semiconductor substrate formed on a front surface thereof with a plurality of streets in a grid pattern and with a device in each of regions partitioned by the streets, the wafer processing method comprising:

a protective member adhering step of adhering a protective member to a front surface side of the wafer;

a grinding step of holding the wafer by a chuck table, with the protective member interposed therebetween, and grinding a back surface side of the wafer to thin the wafer to a predetermined thickness;

a polishing step of polishing the back surface side of the wafer, having been ground in the grinding step, by a polishing pad containing abrasive grains to remove a crushed layer formed in the grinding step and at the same time, to form processing strains being a gettering layer on the back surface of the wafer; and

a plasma processing step of supplying a plasmatized inert gas to the back surface side of the wafer, having been polished in the polishing step, to remove silicon of a surface layer of the processing strains and to modify the surface layer of the processing strain into an amorphous-formed layer being a preliminary gettering layer so that the gettering layer processed after the plasma processing step includes processing

strains formed on the back surface of the wafer and a preliminary gettering layer formed at the surface of processing strains.

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

a modified layer forming step of applying a laser beam of such a wavelength as to be transmitted through the semiconductor substrate along the streets to form modified layers inside the wafer along the streets, before carrying out the grinding step, wherein

the wafer is divided by a grinding stress by the grinding step, with the modified layers as breakage start points.

3. The wafer processing method according to claim 1, further comprising:

a cutting step of forming cut grooves of a depth in excess of a finished thickness by a cutting blade along the streets from the front surface side of the wafer, before carrying out the grinding step, wherein,

in the grinding step, the cut grooves are exposed on the back surface side, whereby the wafer is divided.