WHAT IS CLAIMED IS:

1. A method of manufacturing a substrate for an acoustic wave device, the substrate having a piezoelectric material layer with a predetermined thickness formed along a surface on one side of a support substrate, the method comprising:

a joining step of joining the piezoelectric material layer to the surface on the one side of the support substrate to form a composite substrate, said composite substrate having a notch that indicates a crystal orientation of said composite substrate;

a grinding step of holding the support substrate side by a chuck table of a grinding apparatus and grinding and thinning the piezoelectric material layer, after the joining step;

a removal amount map forming step of measuring in-plane thickness of the piezoelectric material layer by an optical thickness meter, calculating a removal amount for the piezoelectric material layer for adjusting thickness variability of the piezoelectric material layer to or below a threshold on a basis of coordinates defined in an X-axis and a Y-axis relative to said notch that intersect each other in the in-plane thickness, and forming a removal amount map based on the calculated removal

amounts, after the grinding step;

a laser processing step of applying a pulsed laser beam of such a wavelength as to be absorbed in the piezoelectric material layer from a surface of the piezoelectric material layer, and selectively removing the piezoelectric material layer by ablation processing, based on the removal amount map forming step, to adjust the thickness variability to or below the threshold; and

a polishing step of holding the support substrate side by a chuck table of a polishing apparatus, and polishing the surface of the piezoelectric material layer by a polishing pad, to form the piezoelectric material layer of a predetermined thickness while maintaining the in-plane thickness variability, after the laser processing step.

2. The method of manufacturing the substrate for the acoustic wave device according to claim 1, wherein scanning conditions of the pulsed laser beam applied in the laser processing step are determined from a removal amount of the piezoelectric material layer per pulse that is preliminarily measured.

3. The method of manufacturing the substrate for the acoustic wave device according to claim 2, wherein the scanning conditions of the pulsed laser beam applied

in the laser processing step are different for at least two positions on said piezoelectric material layer, wherein said at least two positions are at different coordinates on the X-axis and the Y-axis.

4. The method of manufacturing the substrate for the acoustic wave device according to claim 2, wherein the scanning conditions include at least one moving rate and a moving speed of the pulsed laser beam on the surface of the piezoelectric material layer.

5. The method of manufacturing the substrate for the acoustic wave device according to claim 1, wherein in the grinding step, the surface of the piezoelectric material layer is ground by a rough grinding grindstone, after which the surface of the piezoelectric material layer is finish-ground by a finish grinding grindstone finer in abrasive grain size than the rough grinding grindstone, to restrain irregular reflection of measurement light of the optical thickness meter.

6. The method of manufacturing the substrate for the acoustic wave device according to claim 1, wherein the polishing step is chemical mechanical polishing processing.

7. The method of manufacturing the substrate for the acoustic wave device according to claim 1, wherein

the support substrate is lower in thermal expansion coefficient than the piezoelectric material layer, and is a semiconductor or an insulating material.

8. The method of manufacturing the substrate for the acoustic wave device according to claim 1, wherein the joining step includes joining the piezoelectric material layer to the surface on the one side of the support substrate by adhering the piezoelectric material layer to the surface with an adhesive.

9. The method of manufacturing the substrate for the acoustic wave device according to claim 1, wherein the joining step includes directly joining the piezoelectric material layer to the surface on the one side of the support substrate by application of an ion beam of an inert gas.