CLAIMS

[Claim 1] A method of manufacturing a processed product, the method comprising:

a preparing step of preparing a workpiece including at least a lead frame having a groove portion formed in advance along a position to be cut;

a surface layer removing step of, before cutting the workpiece, partially removing a surface layer portion forming the groove portion in the workpiece; and

a plating step of, before cutting the workpiece, performing a plating treatment on the workpiece from which the surface layer portion is partially removed, wherein

in a state before the surface layer removing step is performed, the surface layer portion includes

a cut region to be removed by cutting the workpiece, and

an uncut region located between the cut region and an opening end of the groove portion, and

in the surface layer removing step, at least a part of the uncut region is removed, wherein

in a state after the surface layer removing step is performed and before the workpiece is cut, the surface layer portion includes a boundary portion between the cut region and the uncut region, and

when a position of a surface of the surface layer portion in a depth direction of the groove portion is defined as a height,

in the state after the surface layer removing step is performed and before the workpiece is cut, a height of a surface of at least a part of the uncut region is lower than a height of a surface of the boundary portion,

in the state after the surface layer removing step is performed and before the workpiece is cut, a height of a surface of at least a part of the cut region is higher than a height of a surface of the boundary portion.

[Claim 2] The method of manufacturing a processed product according to claim 1, wherein, in the surface layer removing step, in addition to the at least a part of the uncut region, a portion of the cut region is also removed, the portion being located close to the uncut region.

[Claim 3] The method of manufacturing a processed product according to claim 1 or 2, wherein, in the state before the surface layer removing step is performed, the uncut region has a surface shape curved to be located closer to a center position in a groove width direction than to the opening end of the groove portion toward a bottom portion of the groove portion.

[Claim 4] The method of manufacturing a processed product according to any one of claims 1 to 3, wherein the surface layer removing step is performed using a laser.

[Claim 5] The method of manufacturing a processed product according to any one of claims 1 to 4, wherein the workpiece prepared in the preparing step has the groove portion formed by wet etching.

[Claim 6] A method of manufacturing a semiconductor device employing the method of manufacturing a processed product according to any one of claims 1 to 5, the method of manufacturing a semiconductor device comprising:

a resin sealing step of sealing the lead frame and a semiconductor chip with a resin material in a state in which the semiconductor chip is bonded to the lead frame;

a resin removing step of removing the resin material inside the groove portion; and

a cutting step of cutting the lead frame along the groove portion, wherein

as the method of manufacturing a processed product,

the surface layer removing step and the plating step are performed between the resin removing step and the cutting step,

the surface layer removing step and the plating step are performed before the resin sealing step, or

the surface layer removing step is performed before the resin sealing step, and the plating step is performed between the resin removing step and the cutting step.

[Claim 7] A processed product manufacturing apparatus that performs processing on a workpiece including at least a lead frame having a groove portion formed in advance along a position to be cut, the processed product manufacturing apparatus comprising:

a surface layer removing unit that, in a state in which the workpiece is not cut, partially removes a surface layer portion forming the groove portion in the workpiece; and

a plating treatment unit that, in the state in which the workpiece is not cut, performs a plating treatment on the workpiece from which the surface layer portion is partially removed, wherein

in a state before the surface layer removing unit partially removes the surface layer portion, the surface layer portion includes

a cut region to be removed by cutting the workpiece, and

an uncut region located between the cut region and an opening end of the groove portion, and

the surface layer removing unit removes at least a part of the uncut region, wherein

in a state before the surface layer removing unit partially removes the surface layer portion, the surface layer portion includes a boundary portion between the cut region and the uncut region, and

when a position of a surface of the surface layer portion in a depth direction of

the groove portion is defined as a height,

in the state before the surface layer removing unit partially removes the surface layer portion, a height of a surface of at least a part of the uncut region is lower than a height of a surface of the boundary portion,

in the state before the surface layer removing unit partially removes the surface layer portion, a height of a surface of at least a part of the cut region is higher than a height of a surface of the boundary portion.