CLAIMS

1. A functional ceramic substrate unit, comprising:

a ceramic substrate having a base material composed of an amorphous phase and particles composed of a crystalline phase and dispersed in the base material, some of the particles protruding from at least one surface of the base material and having flattened surfaces;

a conductive element formed on the at least one surface of the base material of the ceramic substrate via the particles; and a metal element attached to the conductive element.

2. The functional ceramic substrate unit according to claim 1, wherein the amorphous phase contains glass; and the crystalline phase contains a crystalline filler.

3. The functional ceramic substrate unit according to claim 1 or 2, wherein a ratio of the particles protruding from the base material to an area of the at least one surface of the base material is in a range of 0.3 to 0.45.

4. The functional ceramic substrate unit according to any one of claims 1 to 3, wherein the conductive element includes a Ti film. ~~surfaces of the some of the particles protruding from the at least one surface of the base material are flattened.~~

5. A manufacturing method of the functional ceramic substrate unit according to claim 1, comprising:

producing a sintered ceramic body, the sintered ceramic body having a base material composed of an amorphous phase and particles composed of a crystalline phase and dispersed in the base material;

after producing the sintered ceramic body, performing a chemical mechanical polishing treatment on at least one surface of the sintered ceramic body so as to allow some of the particles to protrude from the at least one surface of the sintered ceramic body and to flatten surfaces of the particles protruding from the at least one surface of the sintered ceramic body;

~~after producing the sintered ceramic body and before performing the chemical mechanical polishing treatment, performing a mechanical polishing treatment on the at least one surface of the sintered ceramic body;~~ and

after performing the chemical mechanical polishing treatment, forming a

conductive element directly on the at least one surface of ~~the base material of~~ the sintered ceramic body.

6. The manufacturing method of the functional ceramic substrate unit according to claim 1, wherein the conductive element has a layer structure in which a Ti layer, a Cu layer and a Au layer are successively laminated together.