What is claimed is:

1. A manufacturing method of a substrate with a bump structure includes:

providing a semiconductor substrate having a base, at least one conductive pad and a protective layer, wherein the at least one conductive pad is formed on the base, the protective layer covers the base and comprises at least one first opening for revealing the at least one conductive pad;

forming an under bump metallurgy layer for covering the protective layer and the at least one conductive pad, wherein the under bump metallurgy layer electrically connects to the at least one conductive pad and includes a pre-retained portion and a pre-removed portion;

forming a photoresist layer for covering the under bump metallurgy layer;

patterning the photoresist layer, the patterned photoresist layer comprises at least one second opening for revealing the pre-retained portion of the under bump metallurgy layer;

forming a copper layer within the at least one second opening of the photoresist layer, the copper layer electrically connects to the pre-retained portion of the under bump metallurgy layer;

forming a nickel layer within the at least one second opening of the photoresist layer, the nickel layer is formed on top of the copper layer and electrically connects to the copper layer, wherein a bump structure is composed of the nickel layer and the copper layer, the nickel layer comprises a top surface and a bottom surface, a vertical distance between the top surface and the bottom surface is the thickness of the nickel layer, wherein the thickness of the nickel layer depends on a calculation formula $H=12.289D+96.674$, H means the hardness of the bump structure after

annealing process, the unit of the hardness of the bump structure after annealing process is Hv, D means the thickness of the nickel layer, and the unit of the thickness of the nickel layer is um;

removing the photoresist layer for revealing the pre-removed portion of the under bump metallurgy layer; and

removing the pre-removed portion of the under bump metallurgy layer by using the bump structure as a mask to retain the pre-retained portion of the under bump metallurgy layer.

2. The manufacturing method of a substrate with a bump structure in accordance with claim 1, wherein the copper layer comprises a top side and a bottom side, a vertical distance between the top side and the bottom side is the thickness of the copper layer, wherein the thickness of the copper layer is not smaller than the thickness of the nickel layer.
3. The manufacturing method of a substrate with a bump structure in accordance with claim 1, wherein between the step of forming the nickel layer and the step of removing the photoresist layer, a connection layer is formed within the at least one second opening of the photoresist layer, and the connection layer is formed on the top surface of the nickel layer.
4. A substrate with a bump structure with a predetermined hardness after annealing process includes:

a semiconductor substrate having a base, at least one conductive pad and a protective layer, wherein the at least one conductive pad is formed on the base, the protective layer covers the base and comprises at least one first opening for revealing the at least one conductive pad;

an under bump metallurgy layer electrically connects to the at least one

conductive pad; and

a bump structure including a copper layer and a nickel layer, the copper layer electrically connects to the under bump metallurgy layer and locates between the under bump metallurgy layer and the nickel layer, the nickel layer comprises a top surface and a bottom surface, a vertical distance between the top surface and the bottom surface is the thickness of the nickel layer, wherein the thickness of the nickel layer depends on a calculation formula H=12.289D+96.674, H means the hardness of the bump structure after annealing process, the unit of the hardness of the bump structure after annealing process is Hv, D means the thickness of the nickel layer, and the unit of the thickness of the nickel layer is um.

5. The substrate with a bump structure in accordance with claim 4, wherein the copper layer comprises a top side and a bottom side, a vertical distance between the top side and the bottom side is the thickness of the copper layer, wherein the thickness of the copper layer is not smaller than the thickness of the nickel layer.
6. The substrate with a bump structure in accordance with claim 4 further includes a connection layer formed on the top surface of the nickel layer.

What is claimed is:

1. A manufacturing method of a substrate (100) with a bump structure (A) includes:

providing a semiconductor substrate (110) having a base (111), at least one conductive pad (112) and a protective layer (113), wherein the at least one conductive pad (112) is formed on the base (111), the protective layer (113) covers the base (111) and comprises at least one first opening (114) for revealing the at least one conductive pad (112);

forming an under bump metallurgy layer (120) for covering the protective layer (113) and the at least one conductive pad (112), wherein the under bump metallurgy layer (120) electrically connects to the at least one conductive pad (112) and includes a pre-retained portion (121) and a pre-removed portion (122);

forming a photoresist layer (130) for covering the under bump metallurgy layer (120);

patterning the photoresist layer (130), the patterned photoresist layer (130) comprises at least one second opening (131) for revealing the pre-retained portion (121) of the under bump metallurgy layer (120);

forming a copper layer (140) within the at least one second opening (131) of the photoresist layer (130), the copper layer (140) electrically connects to the pre-retained portion (121) of the under bump metallurgy layer (120);

forming a nickel layer (150) within the at least one second opening (131) of the photoresist layer (130), the nickel layer (150) is formed on top of

the copper layer (140) and electrically connects to the copper layer (140), wherein a bump structure (A) is composed of the nickel layer (150) and the copper layer (140), the nickel layer (150) comprises a top surface (151) and a bottom surface (152), a vertical distance between the top surface (151) and the bottom surface (152) is the thickness of the nickel layer (150), wherein the thickness of the nickel layer (150) depends on a calculation formula H=12.289D+96.674, H means the hardness of the bump structure (A) after annealing process, the unit of the hardness of the bump structure (A) after annealing process is Hv, D means the thickness of the nickel layer (150), and the unit of the thickness of the nickel layer (150) is um;

removing the photoresist layer (130) for revealing the pre-removed portion (122) of the under bump metallurgy layer (120); and

removing the pre-removed portion (122) of the under bump metallurgy layer (120) by using the bump structure (A) as a mask to retain the pre-retained portion (121) of the under bump metallurgy layer (120).

2. The manufacturing method of a substrate (100) with a bump structure (A) in accordance with claim 1, wherein the copper layer (140) comprises a top side (141) and a bottom side (142), a vertical distance between the top side (141) and the bottom side (142) is the thickness of the copper layer (140), wherein the thickness of the copper layer (140) is not smaller than the thickness of the nickel layer (150).
3. The manufacturing method of a substrate (100) with a bump structure (A) in accordance with claim 1, wherein between the step of forming the nickel layer (150) and the step of removing the photoresist layer (130), a

connection layer (160) is formed within the at least one second opening (131) of the photoresist layer (130), and the connection layer (160) is formed on the top surface (151) of the nickel layer (150).

4. A substrate (100) with a bump structure (A) with a predetermined hardness after annealing process includes:

a semiconductor substrate (110) having a base (111), at least one conductive pad (112) and a protective layer (113), wherein the at least one conductive pad (112) is formed on the base (111), the protective layer (113) covers the base (111) and comprises at least one first opening (114) for revealing the at least one conductive pad (112);

an under bump metallurgy layer (120) electrically connects to the at least one conductive pad (112); and

a bump structure (A) including a copper layer (140) and a nickel layer (150), the copper layer (140) electrically connects to the under bump metallurgy layer (120) and locates between the under bump metallurgy layer (120) and the nickel layer (150), the nickel layer (150) comprises a top surface (151) and a bottom surface (152), a vertical distance between the top surface (151) and the bottom surface (152) is the thickness of the nickel layer (150), wherein the thickness of the nickel layer (150) depends on a calculation formula H=12.289D+96.674, H means the hardness of the bump structure (A) after annealing process, the unit of the hardness of the bump structure (A) after annealing process is Hv, D means the thickness of the nickel layer (150), and the unit of the thickness of the nickel layer (150) is um.

5. The substrate (100) with a bump structure (A) in accordance with claim

4, wherein the copper layer (140) comprises a top side (141) and a bottom side (142), a vertical distance between the top side (141) and the bottom side (142) is the thickness of the copper layer (140), wherein the thickness of the copper layer (140) is not smaller than the thickness of the nickel layer (150).

6. The substrate (100) with a bump structure (A) in accordance with claim 4 further includes a connection layer (160) formed on the top surface (151) of the nickel layer (150).