CLAIMS

What is claimed is:

1. A target particle transferring device, comprising:

(a) a substrate with a thickness of ***T*** and a width of *W*, having a top portion with a thickness of ***t*** and a bottom portion with a thickness of ***T-t*** immediately adjacent to the top portion, the top portion having a top surface and the bottom portion having a bottom surface opposite to the top surface;

(b) a notch structure formed in the bottom portion of the substrate, comprising: a groove with a width of ***W1***, located at a distance of ***t*** below the top surface of the substrate, wherein the groove is formed in the bottom portion from the bottom surface extending toward the top portion; and

(c) a target substrate portion with a width of ***W2*** and a thickness of ***T***, located in the top and bottom portions of the substrate and being surrounded by the groove;

wherein the substrate width **W** is greater than the summation of the width ***W2*** of the target substrate portion and the double groove width $2\times$***W1***.

2. The target particle transferring device of claim 1, wherein the substrate is made out of a hard material.

3. The target particle transferring device of claim 1, further comprising a particle of interest attached onto the target substrate portion.

4. The target particle transferring device of claim 1, wherein the top surface is flat.

5. The target particle transferring device of claim 1, wherein the top surface of the substrate is non-flat, and the substrate comprises multiple wells evenly spaced apart and spanning the top and bottom portions of the substrate, each well having a depth of ***d*** that is smaller than the substrate thickness ***T***.

6. The target particle transferring device of claim 5, further comprising a particle of interest, wherein the particle of interest is inside a well and attached onto the target substrate portion.

7. The target particle transferring device of claim 3 or 6, which comprises a plurality of the notch structures.

8. The target particle transferring device of claim 7, further comprising a hollow structure spanning the bottom portion of the substrate and the top portion of the substrate, wherein the width of the hollow structure spanning the top portion of the substrate is ***W2***, and the width of the hollow structure spanning the bottom portion of the substrate is the summation of $2\times$***W1*** and ***W2***, and the maximum depth of the hollow structure is **T**.

9. The target particle transferring device of claim 1, wherein the substrate is made of a plastic material.

10. The target particle transferring device of claim 3 or 6, wherein the particle is at least one selected from the group consisting of a cell, a virus, a bacteria, and a microparticle.

11. The target particle transferring device of claim 3 or 6, wherein the particle is enclosed within a closed chamber.

12. A method of transferring a target particle from one device to another device, comprising:

(i) providing a target particle transferring device of claim 3 or 6;

(ii) using a tool to remove the target substrate portion away from the device along with the particle attached thereto; and

(iii) placing the removed target substrate portion along with the particle attached thereto into a container.

13. A method of transferring a target particle from one device to another device, comprising:

(i) providing a device comprising a substrate with a thickness of ***T*** and a width of *W*, having a top portion and a bottom portion immediately adjacent to the top portion, the top portion having a top surface and the bottom portion having a bottom surface opposite to the top surface;

(ii) identifying one area of the substrate that has a particle of interest attached onto the substrate as a target substrate portion, wherein the target substrate portion has a width of ***W2*** and a thickness of ***T*** and is located in the top and bottom portions of the substrate;

(iii) fabricating a notch structure, the notch structure being formed in the bottom portion of the substrate and comprising:

a groove with a width of ***W1***, located at a distance of ***t*** below the top surface of the substrate, wherein the groove is formed in the bottom portion from the bottom surface extending toward the top portion and surrounds the target substrate portion;

(iv) removing the target substrate portion away from the device along with the particle of interest attached thereto by using a tool; and

(v) placing the removed target substrate portion along with the particle attached thereto into a container.

14. A method of transferring a target particle from one device to another device, comprising:

(i) providing a device comprising a substrate with a thickness of ***T*** and a width of *W*, having a top portion and a bottom portion immediately adjacent to the top portion, the top portion having a top surface and the bottom portion having a bottom surface opposite to the top surface**;** wherein the substrate is made out of a soft material;

(ii) identifying one area of the substrate that has a particle of interest attached onto the substrate as a target substrate portion, wherein the target substrate portion has a width of ***W2*** and a thickness of ***T*** and is located in the top and bottom portions of the substrate;

(iii) removing the target substrate portion away from the device along with the particle of interest attached onto the target substrate portion by using a tool; and

(iv) placing the removed target substrate portion along with the particle attached thereto into a container.

15. The method of claim 14, wherein the top surface of the substrate is non-flat, and the substrate comprises multiple wells evenly spaced apart and spanning the top and bottom portions of the substrate, each well having a depth of ***d*** that is smaller than the substrate thickness ***T***, wherein the particle of interest is inside a well and attached onto the target substrate portion.

16. The method of claim 14 or 15, wherein the tool is adapted for punching out only the target substrate portion with the particle of interest attached thereto from the top surface of the substrate.

17. The method of claim 14, wherein the step of removing does not involve an operation under a microscopic observation.

18. The method of claim 14, wherein the top surface of the substrate is flat.

19. The method of claim 14 or 15, wherein the soft material is polydimethylsiloxane (PDMS).