CLAIMS

1. A method of fine pitch patterning on a substrate in a wafer level packaging process, comprising:

performing a first warpage correction process on the substrate by ramping to and holding the substrate at a first temperature for a first duration and ramping to and holding a second temperature for a second duration, wherein the first temperature is greater than the second temperature;

forming vias in a polymer layer on the substrate;

curing the polymer layer;

performing a second warpage correction process on the substrate by ramping to and holding the substrate at a third temperature for a third duration and ramping to and holding the substrate at a fourth temperature for a fourth duration, wherein the third temperature is greater than the fourth temperature; and

forming a redistribution layer on the substrate with a fine pitch patterning having a line/space of 10/10μm or less.

2. The method of claim 1, wherein the fine pitch patterning has a line/space of 5/5μm or less.

3. The method of claim 1, wherein the fine pitch patterning has a line/space of 2/2μm or less.

4. The method of claim 1, wherein the substrate has a warpage of 500μm or less after the second warpage correction process.

5. The method of claim 4, wherein the substrate has a warpage of 400μm or less after the second warpage correction process.

6. The method of claim 1, wherein the first temperature of the first warpage correction process is greater than the third temperature of the second warpage correction process.

7. The method of claim 1, wherein the first temperature of the first warpage correction process is approximately equal to the third temperature of the second warpage correction process.

8. The method of claim 1, wherein the first temperature is adjusted prior to performing additional warpage correction processes to increase warpage correction performance.

9. The method of claim 1, wherein the first temperature is approximately a glass transition temperature of the polymer layer on the substrate.

10. The method of claim 1, wherein the first temperature, the second temperature, the third temperature, or the fourth temperature is obtained by ramping linearly.

11. The method of claim 1, wherein the first temperature is lower than a glass transition temperature of the polymer layer when a plasma vapor deposition (PVD) process has been performed prior to the first warpage correction process.

12. The method of claim 1, wherein the substrate is a reconstituted wafer composed of multiple dies.

13. The method of claim 1, further comprising:

performing a chemical mechanical polishing (CMP) process to enhance the fine pitch patterning.

14. A non-transitory, computer readable medium having instructions stored thereon that, when executed, cause a method of fine pitch patterning on a substrate in a wafer level packaging process to be performed, the method comprising:

performing a first warpage correction process on the substrate by ramping to and holding the substrate at a first temperature for a first duration and ramping to and holding a second temperature for a second duration, wherein the first temperature is greater than the second temperature;

forming vias in a polymer layer on the substrate;

curing the polymer layer;

performing a second warpage correction process on the substrate by ramping to and holding the substrate at a third temperature for a third duration and ramping to and holding the substrate at a fourth temperature for a fourth duration, wherein the third temperature is greater than the fourth temperature; and

forming a redistribution layer on the substrate with a fine pitch patterning having a line/space of 10/10µm or less.

15. The non-transitory, computer readable medium of claim 14, wherein the first temperature of the first warpage correction process is greater than the third temperature of the second warpage correction process, wherein the substrate has a warpage of 400µm or less after the second warpage correction process, and wherein the fine pitch patterning has a line/space is 2/2µm or less.