WHAT IS CLAIMED IS:

1. A method comprising:

having a first wafer bonding recipe and a model of a wafer bonding process, the model comprising an input indicative of a physical parameter of a first wafer to be bonded to a second wafer and configured to output a wafer bonding recipe based, at least in part, on the physical parameter of the first wafer;

obtaining measurements of the first wafer to obtain the physical parameter of the first wafer;

generating, by the model, the first wafer bonding recipe based, at least in part, on the physical parameter of the first wafer; and

bonding the first wafer to the second wafer in accordance with the first wafer bonding recipe to produce a first post-bond wafer,

wherein the method further comprises deriving the model of the wafer bonding process, comprising:

obtaining measurements of a third wafer and a fourth wafer to obtain a physical parameter of the third wafer and a physical parameter of the fourth wafer;

simulating wafer bonding of the third wafer and the fourth wafer in accordance with process conditions to estimate a physical parameter of a simulated post-bond wafer; and

creating the model of the wafer bonding process in accordance with the physical parameter of the third wafer, the physical parameter of the fourth wafer, the process conditions, and the estimated physical parameter of the simulated post-bond wafer.

2. The method of claim 1, further comprising annealing the first post-bond wafer to produce a fusion bonded wafer.

3. The method of claim 1, wherein the physical parameter of the first wafer comprises out-of-plane distortions of the first wafer.

4. The method of claim 1, wherein creating the model of the wafer bonding process comprises:

comparing the physical parameter of the third wafer, the physical parameter of the fourth wafer, the process conditions, and the estimated physical parameter of the simulated post-bond wafer; and

determining the model of the wafer bonding process in accordance with the comparison.

5. The method of claim 4, wherein generating the first wafer bonding recipe comprises:

estimating, by the model, post-bond distortions of the first post-bond wafer in accordance with the physical parameter of the first wafer;

tuning process conditions of the first wafer bonding recipe to optimize the estimated post-bond distortions of the first post-bond wafer; and

generating the first wafer bonding recipe in accordance with the tuned process conditions.

6. The method of claim 1, further comprising obtaining measurements of the second wafer to obtain a physical parameter of the second wafer, wherein the first wafer bonding recipe is further generated based on the physical parameter of the second wafer.

7. The method of claim 1, further comprising bonding a third wafer to a fourth wafer in accordance with the first wafer bonding recipe to produce a second post-bond wafer.

8. The method of claim 7, wherein the first wafer and the third wafer are part of a first wafer lot, and the second wafer and the fourth wafer are part of a second wafer lot, and wherein the first wafer lot and the second wafer lot are processed together in a semiconductor fabrication process flow.

9. A method comprising:

having a model of a wafer bonding process, the model comprising an input indicative of a physical parameter of a first post-bond wafer and configured to output a wafer bonding

recipe based on the physical parameter of the first post-bond wafer;

bonding a first wafer to a second wafer in accordance with a wafer bonding recipe, to form the first post-bond wafer;

obtaining measurements of the first post-bond wafer to obtain the physical parameter of the first post-bond wafer;

generating, by the model, the first wafer bonding recipe in accordance with the physical parameter of the first post-bond wafer; and

bonding a third wafer to a fourth wafer in accordance with the first wafer bonding recipe, to form a second post-bond wafer.

10. The method of claim 9, further comprising annealing the first post-bond wafer to produce a first fusion bonded wafer; and annealing the second post-bond wafer to produce a second fusion bonded wafer.

11. The method of claim 9, wherein obtaining measurements comprises scanning the first post-bond wafer to obtain the physical parameter of the first post-bond wafer.

12. The method of claim 9, further comprising:

obtaining measurements of the second post-bond wafer to obtain a physical parameter of the second post-bond wafer;

generating, by the model, a second wafer bonding recipe in accordance with the physical parameter of the second post-bond wafer; and

bonding a fifth wafer to a sixth wafer in accordance with the second wafer bonding recipe to form a third post-bond wafer.

13. A processing system comprising:

a non-transitory computer-readable storage medium comprising instructions that when executed cause a processor of a computing device to perform operations in coordination with a semiconductor wafer fabrication process, the instructions comprising:

having a first wafer bonding recipe and a model of a wafer bonding process,

the model comprising an input indicative of a physical parameter of a first wafer to be bonded to a second wafer and configured to output a wafer bonding recipe based on the physical parameter of the first wafer;

obtaining measurements of the first wafer to obtain the physical parameter of the first wafer;

generating, by the model, the first wafer bonding recipe based on the physical parameter of the first wafer; and

bonding the first wafer to the second wafer in accordance with the first wafer bonding recipe to produce a first post-bond wafer,

wherein the instructions further comprise deriving the model of the wafer bonding process comprising:

obtaining measurements of third wafer and fourth wafer to obtain a physical parameter of the third wafer and a physical parameter of the fourth wafer;

simulating wafer bonding of the third wafer and the fourth wafer in accordance with process conditions to estimate a physical parameter of a simulated post-bond wafer; and

creating the model of the wafer bonding process in accordance with the physical parameter of the third wafer, the physical parameter of the fourth wafer, the process conditions, and the estimated physical parameter of the simulated post-bond wafer.

14. The processing system of claim 13, further comprising:

a process chamber;

a substrate holder in the process chamber, the substrate holder configured to mechanically support the second wafer when the first wafer is bonded to the second wafer; and

a batch system to hold a plurality of wafers outside the process chamber.

15. The processing system of claim 13, wherein creating the model of the wafer bonding process comprises:

comparing the physical parameter of the third wafer, the physical parameter of the fourth wafer, the process conditions, and the estimated physical parameter of the simulated post-bond wafer; and

determining the model of the wafer bonding process in accordance with the comparison.

16. The processing system of claim 15, wherein generating the first wafer bonding recipe comprises:

estimating, by the model, post-bond distortions of the first post-bond wafer in accordance with the physical parameter of the first wafer;

tuning process conditions of the first wafer bonding recipe to optimize the estimated post-bond distortions of the first post-bond wafer; and

generating the first wafer bonding recipe in accordance with the tuned process conditions.

17. The processing system of claim 13, wherein the instructions further comprise bonding a third wafer to a fourth wafer in accordance with the first wafer bonding recipe to produce a second post-bond wafer.

18. The processing system of claim 13, wherein the processing system comprises a wafer bonding system.