Claims

1. A system, comprising:

a controller, wherein the controller includes one or more processors and memory configured to store one or more sets of program instructions, wherein the one or more processors are configured to execute the one or more sets of program instructions, wherein the one or more sets of program instructions are configured to cause the one or more processors to:

perform at least a first characterization process via one or more characterization sub-systems prior to at least one discrete backside film deposition process on a semiconductor wafer;

perform at least an additional characterization process via the one or more characterization sub-systems following the at least one discrete backside film deposition process on the semiconductor wafer;

determine at least one of a film force or one or more in-plane displacements for at least one discrete backside film deposited on the semiconductor wafer via the at least one discrete backside film deposition process based on the at least the first characterization process and the at least the additional characterization process; and

provide at least one of the film force or the one or more in-plane displacements to at least one process tool via at least one of a feed forward loop or a feedback loop to improve performance of one or more fabrication processes,

wherein at least one of the at least the first characterization process or the at least the additional characterization process comprises at least one of one or more film property characterization processes or one or more intensity spectra characterization processes.

2. The system in Claim 1, wherein the one or more film property characterization processes are configured to characterize at least one of a thickness, a real component of an index of refraction, or a complex component of the index of refraction of the at least one discrete backside film deposited on the

semiconductor wafer via the at least one discrete backside film deposition process.

3. The system in Claim 1, wherein the one or more characterization sub-systems comprise at least one reflection-mode characterization tool configured to perform at least one of the one or more film properties characterization processes or the one or more intensity spectra characterization processes on the semiconductor wafer.

4. The system in Claim 3, wherein the at least the first characterization process and the at least the additional characterization process further comprise one or more wafer geometry characterization processes on the semiconductor wafer.

5. The system in Claim 4, wherein the one or more characterization sub-systems comprise at least one interferometer tool configured to perform the one or more wafer geometry characterization processes on the semiconductor wafer.

6. The system in Claim 5, wherein the at least one reflection-mode characterization tool and the at least one interferometer tool are integrated characterization tools within the characterization sub-system.

7. The system in Claim 5, wherein the at least one reflection-mode characterization tool and the at least one interferometer tool are stand-alone characterization tools within the characterization sub-system.

8. The system in Claim 4, wherein the at least one process tool is configured to perform the one or more fabrication processes on the semiconductor wafer.

9. The system in Claim 8, wherein the at least one process tool comprises at least one film deposition tool configured to perform one or more discrete frontside film deposition processes on the semiconductor wafer.

10. The system in Claim 8, wherein the at least one process tool comprises at least one film deposition tool configured to perform one or more discrete backside film deposition processes on the semiconductor wafer.

11. The system in Claim 8, wherein the at least one process tool comprises at least one lithography tool configured to perform one or more lithography processes on the semiconductor wafer.

12. The system in Claim 11, wherein the one or more sets of program instructions are further configured to cause the one or more processors to:

provide at least one of the film force or the one or more in-plane displacements to the one or more characterization sub-systems via at least one of the feed forward loop or the feedback loop to improve performance of the at least the first characterization process or the at least the additional characterization process.

13. The system in Claim 11, wherein the one or more sets of program instructions are configured to cause the one or more processors to:

perform the at least the first characterization process, including:

perform at least one of the one or more wafer geometry characterization processes prior to at least one of the one or more lithography processes; and

perform at least one of the one or more film property characterization processes following the at least one of the one or more lithography processes and prior to the at least one discrete backside film deposition process; and

perform the at least the additional characterization process, including:

perform at least one of the one or more film property characterization processes following the at least one discrete backside film deposition process and prior to at least an additional of the one or more lithography processes; and

perform an additional wafer geometry characterization process following the at least one discrete backside film deposition process and prior to the at least the additional of the one or more lithography processes.

14. The system in Claim 11, wherein the one or more sets of program instructions are configured to cause the one or more processors to:

perform the at least the first characterization process, including:

perform at least one of the one or more wafer geometry characterization processes prior to at least one of the one or more lithography processes; and

perform at least one of the one or more intensity spectra characterization processes following the at least one of the one or more lithography processes and prior to the at least one discrete backside film deposition process; and

perform the at least the additional characterization process, including:

perform at least one of the one or more intensity spectra characterization processes following the at least one discrete backside film deposition process and prior to at least an additional of the one or more lithography processes; and

perform an additional wafer geometry characterization process following the at least one discrete backside film deposition process and prior to the at least the additional of the one or more lithography processes.

15. The system in Claim 11, wherein the one or more sets of program instructions are configured to cause the one or more processors to:

perform the at least the first characterization process, including:

perform at least one of the one or more wafer geometry characterization processes prior to at least one of the one or more lithography processes; and

perform the at least the additional characterization process, including:

perform at least one of the one or more film property characterization processes or the one or more intensity spectra characterization processes following the at least one discrete backside film deposition process and prior to at least an additional of the one or more lithography processes; and

perform an additional wafer geometry characterization process following the at least one discrete backside film deposition process and prior to the at least the additional of the one or more lithography processes.

16. The system in Claim 1, wherein the one or more sets of program instructions are configured to cause the one or more processors to:

perform the at least the first characterization process, including:

perform at least one of the one or more film property characterization processes or the one or more intensity spectra characterization processes following at least one of the one or more lithography processes and prior to the at least one discrete backside film deposition process; and

perform the at least the additional characterization process, including:

perform at least one of the one or more film property characterization processes or the one or more intensity spectra characterization processes following the at least one discrete backside film deposition process and prior to at least an additional of the one or more lithography processes.

17. A system, comprising:

a characterization sub-system; and

a controller, wherein the controller includes one or more processors and memory configured to store one or more sets of program instructions, wherein the one or more processors are configured to execute the one or more sets of program instructions, wherein the one or more sets of program instructions are configured to cause the one or more processors to:

perform at least a first characterization process via one or more characterization sub-systems prior to at least one discrete backside film deposition process on a semiconductor wafer;

perform at least an additional characterization process via the one or more characterization sub-systems following the at least one discrete backside film deposition process on the semiconductor wafer;

determine at least one of a film force or one or more in-plane displacements for at least one discrete backside film deposited on the semiconductor wafer via the at least one discrete backside film deposition process based on the at least the first characterization process and the at least the additional characterization process; and

provide at least one of the film force or the one or more in-plane displacements to at least one process tool via at least one of a feed forward loop or a feedback loop to improve performance of one or more fabrication processes,

wherein at least one of the at least the first characterization process or the at least the additional characterization process comprises at least one of one or more film property characterization processes or one or more intensity spectra characterization processes.

18. The system in Claim 17, wherein the one or more sets of program instructions are further configured to cause the one or more processors to:

provide at least one of the film force or the one or more in-plane displacements to the one or more characterization sub-systems via at least one

of the feed forward loop or the feedback loop to improve performance of the at least the first characterization process or the at least the additional characterization process.

19. A method, comprising:

performing at least a first characterization process via one or more characterization sub-systems prior to at least one discrete backside film deposition process on a semiconductor wafer;

performing at least an additional characterization process via the one or more characterization sub-systems following the at least one discrete backside film deposition process on the semiconductor wafer;

determining at least one of a film force or one or more in-plane displacements for at least one discrete backside film deposited on the semiconductor wafer via the at least one discrete backside film deposition process based on the at least the first characterization process and the at least the additional characterization process; and

providing at least one of the film force or the one or more in-plane displacements to at least one process tool via at least one of a feed forward loop or a feedback loop to improve performance of one or more fabrication processes,

wherein at least one of the at least the first characterization process or the at least the additional characterization process comprises at least one of one or more film property characterization processes or one or more intensity spectra characterization processes.

20. The method in Claim 19, wherein the one or more film property characterization processes are configured to characterize at least one of a thickness, a real component of an index of refraction, or a complex component of the index of refraction of the at least one discrete backside film deposited on the semiconductor wafer via the at least one discrete backside film deposition process.

21. The method in Claim 19, wherein the at least the first characterization process includes one or more semiconductor characterization processes performed prior to the at least one discrete backside film deposition process on the semiconductor wafer, wherein the at least the additional characterization

process includes one or more semiconductor characterization processes performed following the at least one discrete backside film deposition process on the semiconductor wafer.

22. The method in Claim 19, wherein the at least the first characterization process includes one or more semiconductor characterization processes performed prior to the at least one discrete backside film deposition process on the semiconductor wafer, wherein the at least the additional characterization process includes one or more semiconductor characterization processes performed following each discrete backside film deposition process of the at least one discrete backside film deposition process on the semiconductor wafer.

23. The method in Claim 19, wherein the semiconductor process further includes at least one discrete frontside film deposition process on the semiconductor wafer.

24. The method in Claim 23, wherein the at least one discrete frontside film deposition process includes one or more discrete frontside film deposition processes prior to the at least one discrete backside film process on the semiconductor wafer.

25. The method in Claim 23, wherein the at least one discrete frontside film deposition process includes one or more discrete frontside film deposition processes following the at least one discrete backside film process on the semiconductor wafer.

26. The method in Claim 19, wherein the at least the first characterization process and the at least the additional characterization process comprises one or more wafer geometry characterization processes on the semiconductor wafer.

27. The method in Claim 26, wherein the semiconductor production process further includes one or more lithography processes on the semiconductor wafer.

28. The method in Claim 27, wherein the one or more lithography processes include a first lithography process prior to the at least one discrete backside film process on the semiconductor wafer.

29. The method in Claim 28, wherein the first characterization process includes one or more semiconductor characterization processes prior to the first lithography process on the semiconductor wafer.

30. The method in Claim 29, wherein the one or more lithography processes includes an additional lithography process following the at least one discrete backside film process on the semiconductor wafer.

31. The method in Claim 30, wherein the additional characterization process includes one or more semiconductor characterization processes prior to the additional lithography process on the semiconductor wafer.

32. The method in Claim 31, further comprising:

performing the at least the first characterization process, including:

performing at least one of the one or more wafer geometry characterization processes prior to the first lithography process; and

performing at least one of the one or more film property characterization processes prior to the at least one discrete backside film deposition process; and

performing the at least the additional characterization process, including:

performing at least one of the one or more film property characterization processes following the at least one discrete backside film deposition process; and

performing at least one of the one or more wafer geometry characterization processes following the at least one discrete backside film deposition process and prior to the additional lithography process.

33. The method in Claim 31, further comprising:

performing the at least the first characterization process, including:

performing at least one of the one or more wafer geometry characterization processes prior to the first lithography process; and

performing at least one of the one or more intensity spectra characterization processes prior to the at least one discrete backside film deposition process; and

performing the at least the additional characterization process, including:

performing at least one of the one or more intensity spectra characterization processes following the at least one discrete backside film deposition process; and

performing at least one of the one or more wafer geometry characterization processes following the at least one discrete backside film deposition process and prior to the additional lithography process.

34. The method in Claim 31, further comprising:

performing the at least the first characterization process, including:

performing at least one of the one or more wafer geometry characterization processes prior to the first lithography process; and

performing the at least the additional characterization process, including:

performing at least one of the one or more film property characterization processes or the one or more intensity spectra characterization processes following the at least one discrete backside film deposition process; and

performing at least one of the one or more wafer geometry characterization processes following the at least one discrete backside film deposition process and prior to the additional lithography process.

35. The method in Claim 31, further comprising:

performing the at least the first characterization process, including:

performing at least one of the one or more film property characterization processes or the one or more intensity spectra characterization processes prior to the first lithography process,

performing the at least the additional characterization process, including:

performing at least one of the one or more film property characterization processes or the one or more intensity spectra characterization processes following the at least one discrete backside film deposition process and prior to the additional lithography process.

36. The method in Claim 27, wherein the one or more of the at least one discrete frontside film deposition process, the at least one discrete backside film deposition process, or the at least one lithography process is performed via the at least one process tool.

37. The method in Claim 19, further comprising:

providing at least one of the film force or the one or more in-plane displacements to the one or more characterization sub-systems via at least one of the feed forward loop or the feedback loop to improve performance of the at least the first characterization process or the at least the additional characterization process.

38. A system, comprising:

a controller, wherein the controller includes one or more processors and memory configured to store one or more sets of program instructions, wherein the one or more processors are configured to execute the one or more sets of program instructions, wherein the one or more sets of program instructions are configured to cause the one or more processors to:

perform at least a first characterization process via one or more characterization sub-systems prior to at least one discrete backside film deposition process on a semiconductor wafer;

perform at least an additional characterization process via the one or more characterization sub-systems following the at least one discrete backside film deposition process on the semiconductor wafer;

determine at least one of a film force or one or more in-plane displacements for at least one discrete backside film deposited on the semiconductor wafer via the at least one discrete backside film deposition process based on the at least the first characterization process and the at least the additional characterization process; and

provide at least one of the film force or the one or more in-plane displacements to at least one process tool via at least one of a feed forward loop or a feedback loop to improve performance of one or more fabrication processes,

wherein the at least the first characterization process and the at least the additional characterization process comprises one or more wafer geometry characterization processes.

39. A system, comprising:

a characterization sub-system; and

a controller, wherein the controller includes one or more processors and memory configured to store one or more sets of program instructions, wherein the one or more processors are configured to execute the one or more sets of program instructions, wherein the one or more sets of program instructions are configured to cause the one or more processors to:

perform at least a first characterization process via one or more characterization sub-systems prior to at least one discrete backside film deposition process on a semiconductor wafer;

perform at least an additional characterization process via the one or more characterization sub-systems following the at least one discrete backside film deposition process on the semiconductor wafer;

determine at least one of a film force or one or more in-plane displacements for at least one discrete backside film deposited on the semiconductor wafer via the at least one discrete backside film deposition process based on the at least the first characterization process and the at least the additional characterization process; and

provide at least one of the film force or the one or more in-plane displacements to at least one process tool via at least one of a feed forward loop or a feedback loop to improve performance of one or more fabrication processes,

wherein the at least the first characterization process and the at least the additional characterization process comprises one or more wafer geometry characterization processes.

40. A method, comprising:

performing at least a first characterization process via one or more characterization sub-systems prior to at least one discrete backside film deposition process on a semiconductor wafer;

performing at least an additional characterization process via the one or more characterization sub-systems following the at least one discrete backside film deposition process on the semiconductor wafer;

determining at least one of a film force or one or more in-plane displacements for at least one discrete backside film deposited on the semiconductor wafer via the at least one discrete backside film deposition process based on the at least the first characterization process and the at least the additional characterization process; and

providing at least one of the film force or the one or more in-plane displacements to at least one process tool via at least one of a feed forward loop or a feedback loop to improve performance of one or more fabrication processes,

wherein the at least the first characterization process and the at least the additional characterization process comprises one or more wafer geometry characterization processes.