

CLAIMS

1. A method of processing a substrate using a processing component disposed within a substrate processing system, comprising:
 - receiving, using an interrogator, one or more signals from a remote communication device coupled to a processing component disposed in the substrate processing system, wherein the one or more signals comprises identifier information relating to the processing component;
 - comparing, using a controller, the identifier information to processing component identifiers stored in a database to authenticate the processing component to determine that the processing component is authorized or compatible for use with the substrate processing system;
 - changing one or more process variables based on the received signals; and
 - performing, using the controller, one or more substrate processing operations, based on the authentication of the processing component.
2. The method of claim 1, further comprising:
 - detecting, using the controller, the presence of the processing component within the substrate processing system based on the one or more signals prior to authenticating the processing component.
3. The method of claim 1, further comprising:
 - processing, using a middleware application residing on the controller, the one or more signals to generate one or more data parameters; and
 - sending, using the middleware application, the one or more data parameters to a user application through one or more application programming interfaces (APIs).
4. The method of claim 1, further comprising:
 - receiving user input from a user interface application through one or more application programming interfaces (APIs); and

sending, using the interrogator, the user input to the remote communication device for storage in a memory thereof.

5. The method of claim 4, wherein the user input includes failure information corresponding to the processing component.

6. The method of claim 4, wherein the user input includes usage information corresponding to the processing component.

7. The method of claim 1, further comprising:
determining that the processing component is authorized for use with a process recipe;
unlocking the process recipe based on the determination that the processing component is authorized for use with the process recipe; and
processing the substrate using the unlocked process recipe.

8. The method of claim 7, wherein performing the one or more substrate processing operations include changing a configuration of the processing system based on the one or more signals.

9. The method of claim 1, wherein the one or more signals include information selected from a group consisting of processing component identifiers, processing component configuration, processing component history, failure information, lifecycle data, customer name, and processing system identification information.

10. The method of claim 1, wherein the processing component is one of a polishing pad, a pad conditioner, or a substrate carrier assembly component including, a carrier housing, a substrate retaining ring, or a flexible diaphragm.

11. The method of claim 7, wherein the substrate processing system is one of a chemical mechanical polishing (CMP) system, a chemical vapor deposition (CVD)

chamber, a physical vapor deposition (PVD) chamber, an ion implantation chamber, in etch processing chamber or system, a photolithography processing system, or a substrate thinning system.

12. The method of claim 1, wherein the remote communication device comprises an RFID tag.

13. A method of processing a substrate, comprising:

- receiving, using an interrogator, one or more signals from a remote communication device coupled to a processing component disposed in a first substrate processing system, wherein the one or more signals comprises identifier information relating to the processing component;

- comparing, using a controller, the identifier information to processing component identifiers stored in a database to authenticate the processing component to determine that the processing component is authorized or compatible for use with the first substrate processing system;

- performing, using the controller, one or more substrate processing operations, based on the authentication of the processing component;

- delivering one or more signals to the remote communication device;

- storing information received in the one or more signals within a memory of the remote communication device before removing the processing component from the first substrate processing system;

- removing the processing component from the first substrate processing system;
- and

- receiving at least a portion of the stored information from the remote communication device after the processing component has been reinstalled within the first substrate processing system or installed within a second substrate processing system.

14. The method of claim 13, further comprising:

performing one or more substrate processing operations on the first or second substrate processing system based on the receipt of the portion of the stored information.

15. The method of claim 13, wherein the stored information comprises information selected from a group consisting of processing component identifiers, processing component configuration, processing component history, failure information, lifecycle data, customer name, and processing system identification information.

16. The method of claim 13, wherein the substrate processing system is one of a chemical mechanical polishing (CMP) system, a chemical vapor deposition (CVD) chamber, a physical vapor deposition (PVD) chamber, an ion implantation chamber, an etch processing chamber or system, a photolithography processing system, or a substrate thinning system.

17. A method of processing a substrate using a processing component disposed within a substrate processing system, comprising:

receiving, using an interrogator, one or more signals from a remote communication device coupled to a processing component disposed in the substrate processing system, wherein the one or more signals comprises identifier information relating to the processing component;

comparing, using a controller, the identifier information to processing component identifiers stored in a database to authenticate the processing component to determine that the processing component is authorized or compatible for use with the substrate processing system;

performing, using the controller, one or more substrate processing operations, based on the authentication of the processing component;

receiving, using the interrogator, one or more signals from the remote communication device which include information relating to one or more processing conditions detected by a sensor coupled to the processing component; and

initiating a change in the processing of the substrate in response to the received sensor information.

18. The method of claim 17, wherein the one or more processing conditions comprise at least one of temperature data, pressure data, electrical conductivity data, elastic modulus data, optical data, acoustic data, and film thickness data.

19. The method of claim 17, wherein the sensor is one of a thermal sensor, an acoustic sensor, a conductivity sensor, and an accelerometer.

20. A method of processing a substrate using a processing component disposed within a substrate processing system, comprising:

receiving, using an interrogator, one or more signals from a remote communication device coupled to a processing component disposed in the substrate processing system, wherein the one or more signals comprises identifier information relating to the processing component;

comparing, using a controller, the identifier information to processing component identifiers stored in a database to authenticate the processing component to determine that the processing component is authorized or compatible for use with a substrate processing recipe;

unlocking the substrate processing recipe based on the authentication of the processing component; and

processing the substrate using the unlocked substrate processing recipe.