CLAIMS

1. A method of processing a substrate in a tool, comprising:

receiving an augmented recipe with a machine learning (ML) and/or an artificial intelligence (AI) module, wherein the augmented recipe comprises:

a recipe for processing the substrate in the tool; and

a matrix identifier that corresponds to one or more substrate properties;

using the ML and/or AI module to retrieve a data set from a database, wherein the data set is associated with the matrix identifier; and

using the ML and/or AI module to modify the augmented recipe to form a modified recipe, wherein the modification is dependent on the data set.

2. The method of claim 1, wherein the matrix identifier comprises a matrix with a single row and a plurality of columns, wherein each column represents a different context parameter.

3. The method of claim 2, wherein the plurality of columns includes at least ten columns.

4. The method of claim 2, wherein a plurality of the plurality of columns are populated with an indicator.

5. The method of claim 4, wherein the indicator is a number between 1 and 1,000.

6. The method of claim 2, wherein the matrix identifier provides a context parameter for one or more of: material type, a resistivity, a substrate thickness, a substrate surface reflectance, a chip layout, a chip size, a chip uniformity, a number of times the substrate has been processed with the recipe, and a position in a lot of substrates.

7. The method of claim 1, wherein the matrix identifier is generated by a host computer, and wherein underlying substrate data used to generate the matrix identifier is not accessible by the ML and/or AI module.

8. The method of claim 1, wherein the data set has no indication of the one or more substrate properties other than the matrix identifier.

9. The method of claim 1, wherein the data set includes data from sensors in the tool during the processing of one or more substrates with the same matrix identifier.

10. The method of claim 9, wherein the sensors include closed loop sensors and witness sensors.

11. The method of claim 1, wherein the data set includes data from metrology of one or more substrates with the same matrix identifier.

12. A method for building a database used by a machine learning (ML) and/or artificial intelligence (AI) module for processing substrates without knowing underlying substrate properties, comprising:

associating a matrix identifier with a first substrate, wherein the matrix identifier corresponds to one or more substrate properties of the first substrate;

processing the first substrate in a tool; and

storing sensor data from the tool during processing of the first substrate in the database, wherein the sensor data is associated with the matrix identifier.

13. The method of claim 12, further comprising:

repeating the operations for a plurality of substrates.

14. The method of claim 12, wherein the sensor data comprises control loop sensor data and witness sensor data.

15. The method of claim 12, wherein the sensor data further comprises metrology data of the processed first substrate.

16. The method of claim 12, wherein the matrix identifier comprises a matrix with a single row and a plurality of columns, wherein each column represents a different context parameter.

17. The method of claim 16, wherein the plurality of columns includes at least ten columns.

18. The method of claim 16, wherein a plurality of the plurality of columns are populated with an indicator.

19. A semiconductor processing tool, comprising:

a host computer;

an artificial intelligence (AI) and/or machine learning (ML) module communicatively coupled to the host computer;

a database communicatively coupled to the AI and/or ML module; and

a processing chamber, wherein:

the host computer is configured to generate or assign a matrix identifier corresponding to one or more substrate properties;

the AI and/or ML module is configured to retrieve from the database a data set associated with the matrix identifier;

the AI and/or ML module is configured to modify a recipe selected by the host computer based on the retrieved data set to form a modified recipe; and

the processing chamber is configured to process a substrate in accordance with the modified recipe.