CLAIMS

1. A method comprising:

receiving first film property data of first substrates produced by manufacturing equipment based on manufacturing parameters, the first film property data comprising first film property values of a first film property type and second film property values of a second film property type that is different from the first film property type;

identifying target film property data comprising first target film property values of the first film property type and second target film property values of the second film property type;

determining that the first film property values and the second film property values are substantially correlated along a first line that is different from a second line, the first target values and the second target values being substantially correlated substantially along the second line;

selecting, by a processing device, a set of data points of the first film property data that are associated with a third line that is substantially orthogonal to the second line associated with the target film property data; and

determining, based on the set of data points, updates to one or more of the manufacturing parameters to generate updated manufacturing parameters, wherein second substrates are to be produced by the manufacturing equipment based on the updated manufacturing parameters to meet the target film property data.

2. The method of claim 1, wherein the manufacturing parameters comprise one or more of hardware parameters or process parameters.

3. The method of claim 1, wherein:

the first film property data is disposed substantially along the first line that is plotted on a graph that has a first axis corresponding to the first film property type and a second axis corresponding to the second film property type;

the target film property data is disposed substantially along the second line that is plotted on the graph;

the set of data points are disposed along the third line plotted on the graph; and

the third line is substantially orthogonal to the second line on the graph.

4. The method of claim 1 further comprising performing feature extraction on the set of data points, wherein the determining of the updates is further based on the feature extraction, and wherein the performing of the feature extraction is via one or more of principal component analysis (PCA), clustering, factor analysis (FA), discriminant analysis, or correlation matrix.

5. The method of claim 1 further comprising training a machine learning model to generate a trained machine learning model for the determining of the updates to the one or more of the manufacturing parameters, wherein the training comprises:

generating training data for the machine learning model, wherein the generating of the training data comprises:

generating first training input comprising historical manufacturing parameters of the manufacturing equipment; and

generating first target output for the first training input, wherein the first target output comprises historical film property data; and

providing the training data to train the machine learning model on (i) a set of training inputs comprising the first training input, and (ii) a set of target outputs comprising the first target output.

6. The method of claim 5 further comprising:

providing the target film property data to the trained machine learning model, wherein the selecting of the set of data points is via the trained machine learning model; and

obtaining an inverted solution comprising one or more outputs from the trained machine learning model, wherein the determining of the updates comprises extracting, from the one or more outputs, the updates to the one or more of the manufacturing parameters.

7. The method of claim 1 further comprising causing the second substrates to be produced by the manufacturing equipment based on the updated manufacturing parameters to meet the target film property data.

8. The method of claim 1 further comprising displaying the updates to the one or more of the manufacturing parameters via a graphical user interface.

9. A system comprising:

a memory; and

a processing device, coupled to the memory, to:

receive first film property data of first substrates produced by manufacturing equipment based on manufacturing parameters, the first film property data comprising first film property values of a first film property type and second film property values of a second film property type that is different from the first film property type;

identify target film property data comprising first target film property values of the first film property type and second target film property values of the second film property type;

determine that the first film property values and the second film property values are substantially correlated along a first line that is different from a second line, the first target values and the second target values being substantially correlated substantially along the second line;

select a set of data points of the first film property data that are associated with a third line that is substantially orthogonal to the second line associated with the target film property data; and

determine, based on the set of data points, updates to one or more of the manufacturing parameters to generate updated manufacturing parameters, wherein second substrates are to be produced by the manufacturing equipment based on the updated manufacturing parameters to meet the target film property data.

10. The system of claim 9, wherein the first line and the second line are substantially parallel.

11. The system of claim 9, wherein:

the manufacturing parameters comprise one or more of hardware parameters or process parameters;

the processing device is to perform feature extraction on the set of data points via one or more of principal component analysis (PCA), clustering, factor analysis (FA), discriminant analysis, or correlation matrix; and

the processing device is to determine the updates further based on the feature extraction.

12. The system of claim 9, wherein the processing device is further to train a machine learning model to generate a trained machine learning model to determine the updates to the one or more of the manufacturing parameters, wherein to train the machine learning model, the processing device is to:

generate training data for the machine learning model, wherein to generate the training data, the processing device is to:

generate first training input comprising historical manufacturing parameters of the manufacturing equipment; and

generate first target output for the first training input, wherein the first target output comprises historical film property data; and

provide the training data to train the machine learning model on (i) a set of training inputs comprising the first training input, and (ii) a set of target outputs comprising the first target output.

13. The system of claim 12, wherein the processing device is further to:

provide the target film property data to the trained machine learning model, wherein the processing device is to select the set of data points and perform feature extraction via the trained machine learning model; and

obtain an inverted solution comprising one or more outputs from the trained machine learning model, wherein to determine the updates, the processing device is to extract, from the one or more outputs, the updates to the one or more of the manufacturing parameters.

14. The system of claim 9, wherein the processing device is further to one or more of:

cause the second substrates to be produced by the manufacturing equipment based on the updated manufacturing parameters to meet the target film property data; or

display the updates to the one or more of the manufacturing parameters via a graphical user interface.

15. A non-transitory computer readable medium having instructions stored thereon, which, when executed by a processing device, cause the processing device to:

receive first film property data of first substrates produced by manufacturing equipment based on manufacturing parameters, the first film property data comprising first film property values of a first film property type and second film property values of a second film property type that is different from the first film property type;

identify target film property data comprising first target film property values of the first film property type and second target film property values of the second film property type;

determine that the first film property values and the second film property values are substantially correlated along a first line that is different from a second line, the first target values and the second target values being substantially correlated substantially along the second line;

select a set of data points of the first film property data that are associated with a third line that is substantially orthogonal to the second line associated with the target film property data; and

determine, based on the set of data points, updates to one or more of the manufacturing parameters to generate updated manufacturing parameters, wherein second substrates are to be produced by the manufacturing equipment based on the updated manufacturing parameters to meet the target film property data.

16. The non-transitory computer readable medium of claim 15, wherein the first line and the second line are substantially parallel.

17. The non-transitory computer readable medium of claim 15, wherein:

the manufacturing parameters comprise one or more of hardware parameters or process parameters;

the processing device is to perform feature extraction on the set of data points via one or more of principal component analysis (PCA), clustering, factor analysis (FA), discriminant analysis, or correlation matrix; and

the processing device is to determine the updates further based on the feature extraction.

18. The non-transitory computer readable medium of claim 15, wherein the processing device is further to train a machine learning model to generate a trained machine learning model

to determine the updates to the one or more of the manufacturing parameters, wherein to train the machine learning model, the processing device is to:

generate training data for the machine learning model, wherein to generate the training data, the processing device is to:

generate first training input comprising historical manufacturing parameters of the manufacturing equipment; and

generate first target output for the first training input, wherein the first target output comprises historical film property data; and

provide the training data to train the machine learning model on (i) a set of training inputs comprising the first training input, and (ii) a set of target outputs comprising the first target output.

19. The non-transitory computer readable medium of claim 18, wherein the processing device is further to:

provide the target film property data to the trained machine learning model, wherein the processing device is to select the set of data points via the trained machine learning model; and

obtain an inverted solution comprising one or more outputs from the trained machine learning model, wherein to determine the updates, the processing device is to extract, from the one or more outputs, the updates to the one or more of the manufacturing parameters.

20. The non-transitory computer readable medium of claim 15, wherein the processing device is further to one or more of:

cause the second substrates to be produced by the manufacturing equipment based on the updated manufacturing parameters to meet the target film property data; or

display the updates to the one or more of the manufacturing parameters via a graphical user interface.