A Study on the Prediction of Density from OES(optical emission spectroscopy) Data Using Machine Learning Algorithm

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Among numerous semiconductor processes, plasma processing is one of the most important, with urgent requirements for real-time monitoring with advanced and integrated diagnostic systems. There are various methods for process monitoring plasma state, but the diagnosis should not affect the plasma process. For this reason, optical diagnosis is the most commonly used method for diagnosing the plasma state in the semiconductor process. The OES(optical emission spectroscopy) data generated by the plasma differs depending on the state of the internal elements, the activity of the electrons, and the internal substances. This principle is used to monitor the end of the etching process and the stability of the vacuum state.

This paper is about predicting plasma OES(density from optical emission spectroscopy) data using machine learning. Unlike previous methods, the new method predicts the density by entering all wavelengths above a certain intensity value, without predefining specific wavelengths. With only OES(optical emission spectroscopy) data, this method will be able to automatically detect plasma process state changes. And we think that by developing this method, it can predict the condition and result of the plasma process.

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