

Run-to-Run Control of Inductively Coupled C₂F₆ Plasma Etching of SiO₂: Multivariable Controller Design and Numerical Application

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A model-based run-to-run control method has been devised for an inductively coupled plasma (ICP) etcher and applied to a numerical process for etching SiO₂ film with C₂F₆ plasmas. The controller was designed to regulate the oxide etch rate and etch uniformity by manipulating the RF power, chamber pressure and RF bias voltage. It was shown that the controller can steer the process to the best achievable state even when the set points are given to be physically unattainable. This performance was demonstrated through numerical simulation together with the normal set point tracking performance.