Control Strategies for Plasma Etching Process of Si in SF_6/O_2

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Nowadays, high etch performance is required in modern semiconductor manufacturing. However, host of chemical and electrical complexities make the etch process difficult to model and control. In this paper, process control strategies have been developed for reactive ion etching of silicon in SF_6/O_2 plasma. Two-frequency capacitively coupled plasma reactor was employed to obtain relationships among manipulated variables and controlled variables. The empirical models were fitted in order to faciliate comparison with experimental trends noted by other investigators, as well as analysis of variable interactions. The closed-loop control exhibited elimination of process disturbance resulting from reflected power and fast set-point tracking capabilities.