

FEEDBACK LOOP CONTROL OF REACTIVE SPUTTERING OF ZrN FIMS

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ABSTRACT

Deposition of ZrN films by reactive magnetron sputtering can be optimized by controlling the reactive gas pressure. The plasma emission in conjunction with a getter box was used as a process control, shifting the operating reactive gas pressure to a region where it can be controlled systematically resulting in a gradual optimization process of deposited films in terms of optical and electrical properties. Hence, the plasma emission controller would allow injection of the reactive gas into the deposition chamber as required by the percentage of spectral line of sputtered target and reactive gas pressure. Minimum resistivity of $2.457 \Omega \mu\text{m}$ was obtained for ZrN film at localized maxima of reactive gas consumption within the operation range of the plasma emission monitor.

KEYWORDS: Hysteresis Effect, unbalanced Magnetron, PEM, ZrN, Flow Rate, Resistivity.