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**Analysis of a lumped element model for radio frequency magnetron discharges**

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Magnetron sputtering is an established technology to deposit thin films with high quality. Employing RF power (instead of the conventional DC power) allows to sputter not only electrically conductive materials but also dielectrics like optical coatings or semiconductors. This work presents a global model for such an RF driven magnetron sputtering process which is an extension of a previously published lumped circuit description of unmagnetized RF discharges [1]. As its predecessor, the model represents the discharge by separate bulk and sheath zones which communicate via Kirchhoff relations. The extension accounts for the presence of a magnetized region with reduced electric conductivity. The model evaluates quickly and may be used for the purpose of model based control.

In addition, the underlying sheath model is considered. Various ion density profiles are incorporated into the model and the respective behaviour is studied.

[1] T. Mussenbrock et al., PSST 16, 377385 (2007)

**Keywords**

Magnetron sputtering

Lumped element model

Sheath modeling