

New Development in Modulated Pulse Power Deposition of Aluminum Oxide and Aluminum Nitride Films

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Modulated pulse power (MPP) sputtering is a versatile high power pulse magnetron sputtering technique in which there can be multiple voltage steps within a pulse. In this study, multiple voltage steps have high amplitude voltage oscillations. It was found that at a certain level of voltage oscillations, amplitude, and frequency it is possible to sustain arc free discharge in reactive gas environment. A special plasma generator with adjustable voltage, oscillations, amplitude, and frequency was developed. The maximum output voltage is 1400V. Aluminum oxide and aluminum nitride films have been reactively deposited with new approach in arc free mode. The deposition rate, film structure, orientation, and mechanical properties were analyzed and measured, and the results of the film property measurements will be presented.