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Thesis Title	*Characterization of Silicon Nitride thin films electrical properties as a function of their stoichiometry*
Supervisor	G. Papaioannou, Professor
Summary	Silicon nitride is of particular interest in the field of telecommunication and microelectronics, due to the plethora of application practices. Thin films of this dielectric are widely used in RF MEMS (Radio Frequency Micro-Electro-Mechanical Systems) switches, which are highly promising devices. The silicon nitride films of RF MEMS switches are deposited with modern microelectronics at low temperatures and exhibit a significant degree of heterogeneity and deviation from stoichiometry. The electrical polarization of these films causes reliability problems in RF MEMS switches, which prevents their commercialization until now. In the present thesis we investigated the electrical properties of amorphous silicon nitride thin films α-SiNx, used in RF MEMS devices, which have been deposited by the PECVD (Plasma Enhanced Vapor Deposition) method at different substrate temperatures and flow rates of reactive gases, in metal-insulator-metal (Ti / Au / Ti) samples of symmetrical capacitors. The study of electrical characteristics was done by measuring the surface potential of the samples at different temperatures with the Single-Point Kelvin Probe system. The effect of the deposition conditions of the films on their depolarization process was investigated. The typical time of depolarization of samples at 300K-400K temperatures was determined and the energizing action of the depolarizer was calculated. Finally, through the recording of the characteristic current-voltage at various temperatures, the conductivity mechanisms and their characteristics were identified and a theoretical model of the Hopping mechanism was used to predict the time course of the depolarization process through the films.
Key words	Amorphous Silicon Nitride Thin Films, MIM Capacitors, PECVD Method, Kelvin Probe, Hopping Conduction, Poole-Frenkel Conduction
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