P26

EFFECTS OF POST-DEPOSITION ANNEALING TIME IN FORMING GAS AMBIENT ON Y_2O_3 FILMS DEPOSITED ON SILICON SUBSTRATE

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ABSTRACT- The effects of post-deposition annealing (PDA) time (15, 30, and 45 min) at 800˚C in forming gas (95% N_2-5% H_2) ambient was systematically studied for RF-magnetron sputtered Y_2O_3 films on n-type Si(100) substrate. X-ray diffraction characterization has revealed the detection of Y_2O_3 phase oriented in (400), (440), (541), and (543) planes for all of the investigated samples. Atomic force microscopy was utilized to acquire 2-dimensional surface topograpy of Y_2O_3 films subjected to different PDA time. An increment in root-mean-square roughness was perceived as PDA time was prolonged. In addition, current-voltage and capacitance-voltage characteristics of the investigated Al/Y_2O_3/Si-based metal-oxide-semiconductor capacitors were also presented in this work.

Keywords: Y_2O_3, post-deposition annealing, time, forming gas, metal-oxide-semiconductor.