

Silicon oxide formation for TFTs using humid ozone-enriched gas ambient at low temperature

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Abstract: Humid ozone-enriched ambient, created by bubbling (O_3+O_2) gas in H_2O_2 or H_2O_2 , enhanced the silicon oxide growth on the Si substrate at 250°C. The film thickness was controllable with the high growth rate of 1.4 Å/min. The XPS data show that the oxide layer on Si(111) has the same transition layer structure as the thermal SiO_2 film. By combination with the short-time treatment at higher temperature (below 500°C), the electrical characteristics of SiO_2 thin films were improved. The operation of polycrystalline Si thin film transistors using this oxide film indicates that the new growth method is applicable for low-temperature device fabrications. © 2004 IEEE.

Index Keywords: Electric fields; Fourier transform infrared spectroscopy; Heating; MOS capacitors; Oxidation; Plasma enhanced chemical vapor deposition; Polycrystalline materials; Quartz; Silica; Ultraviolet radiation; Display-device technologies; Light irradiation; Ozone-enriched gas; Ozone-enriched oxidation; Thin film transistors

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