

The effect of activation annealing on dopant activation and damage recovery for the fabrication of LTPS-TFTs

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Source/drain (or, LDD) formation technology is critical to device characteristic such as leakage current and reliability especially in the case of short channel TFT devices. Non-mass analyzed ion shower doping technique has been widely used for source/drain doping, for lightly doped drain (LDD) formation, and for channel doping in fabrication of low-temperature poly-Si thin-film transistors (LTPS-TFTs). Dopant activation may be done by furnace annealing, excimer laser annealing, and rapid thermal annealing, respectively. Activation annealing should satisfy both the electrical activation of implanted impurities and the annealing of primary crystalline defects. The substrates used were Poly-Si made by excimer laser crystallization on 500 Å-thick PECVD a-Si. Ion shower doping with a main ion source of P_2H_x using a source gas of PH_3/H_2 was conducted on ELA (excimer laser annealing) Poly-Si. We report the effect of annealing method on dopant-activation and damage-recovery.