

Application of Rapid Thermal Annealing To Activation in Low Temperature Polycrystalline Si Thin Films

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Abstract

In combination with powerful organic light-emitting diodes, Low temperature polycrystalline Si (LTPS) transistors offers one of next-generation flat-panel displays due to much higher mobilities compared to that of amorphous Si thin films, ranging from 10 to 500cm²/V-sec. The superior mobility and TFT characteristics are determined by high quality in Si channels, gate dielectric, and ion-doping and activation. Among the three core technologies, The current work places special emphases on the ion activation of doped polycrystalline Si thin film, being tailored for source/drain or lightly-doped drains. Activation techniques have usually been performed using furnace annealing or excimer laser annealing. Furnace annealing suffers from slow processing time and deformation in glasses, and excimer laser annealing from uniformity control, despite the efficiency in processing time. Rapid thermal annealing offers a possibility of solving the above-mentioned demerits, through reasonable combination in processing time and activation efficiency. The current work presents the role of RTA in ion activation through electrical and structural monitoring simultaneously.

Keyword: ion activation, RTA, Si thin films, LTPS