

Direct Deposition of Polycrystalline Silicon Films on Plastic Substrates by Catalytic CVD for Thin Film Transistors

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As-deposited polycrystalline silicon films were studied for applications to thin film transistors for driving active-matrix flat panel displays. Polycrystalline films were successfully deposited directly on plastic substrates at a low-temperature (<200°C) using the catalytic chemical vapor deposition (Cat-CVD), while a high-temperature (>2,000°C) catalyst filament was placed only 5 cm above the substrate. No post-deposition laser annealing treatment was necessary for crystallization.

The influence of various process parameters for the as-deposited poly silicon (as-dep. Si) was investigated. We achieved a low content of hydrogen (~0.9%) and a high deposition rate (~35Å/sec). The thickness of the amorphous incubation layer was less than 5 nm in spite of the low substrate temperature.