The Mask Allocation Problem among Bottleneck Machines in TFT Array Process with Different Re-entrant Layers

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ABSTRACT

The main production process of TFT-LCD (Thin Film Transistor Liquid Crystal Display) can be divided into three stages: TFT Array, Cell and Module processes. The TFT Array process is the most complicated, primarily because Photolithography Process is regarded as a bottleneck in the TFT Array process. During the Photolithography Process, consideration must be given to the collocation problem between the reentry and masks allocation, as well as to the use of expensive stepper or scanners. Furthermore, each type of mask has a certain collocation restriction on the machine. If the mask arrangement is not dealt with first, the system can overload, which causes a blockage in the workflow and leads to a deficiency of material in the subsequent processes. In this study, the characteristics of collocation between reentry and masks allocation in TFT Array process are considered and mathematic planning is proposed to determine the optimal mode of mask allocation in order to satisfy the goal pursued within the scope of planning. The utilization of the bottleneck machine is applied in discussion through experimental design, and then multiple comparisons are made to find the weight values of the difference of allocated quantities and setup times. The experimental results indicate that a significant relationship exists between the weight values and the utilization of the bottlenecked machine.

Keywords : TFT Array ; masks allocation ; reentry

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