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High precise local film thickness correctionMonika Fritzsche¹, Anja Banholzer², Mirko Wölflick², Dirk Rost²¹Meyer Burger (Germany) GmbH, Hohenstein-Ernstthal, Germany ²Meyer Burger (Germany) GmbH, Hohenstein-Ernstthal, Germany

monika.fritzsche@meyerburger.com

The increasing requirements for microelectronics, MEMS and acoustics need very precise films with a low deviation of the film thickness across the substrate surface. Therefore a modulation of the deposited films is necessary as existing deposition methods do not meet these requirements.

The state of development of scanning ion beam tools allows a correction of such films. Due to a continuous improvement of these tools better and highly resolved processes are possible. It is possible to modify all typical semiconductor and oxide materials e.g. Si, SiO₂, Si₃N₄, AlN as well as metals e.g. Au, Cu, Mo or W.

Typical film thicknesses vary less than 1 nm from the target thickness after correcting a wafer. The error distribution is usually much below 1 nm (typical is a range of 0.1 nm to 0.2 nm for one sigma). In order to get such results some requirements have to be fulfilled. These are stability of the ion beam source regarding etch rate and beam size, precision of the movement of the axis system and a precise calculation of the local dwell time. Based on the local target removal an internal software calculates the dwell time at each point of the wafer. Therefore the local target removal should be known in advance in detail. This calculation is done for every single wafer which allows a compensation of slight variations during the previous deposition. Besides such a smoothing of the film thickness across the wafer also each wished topology can be trimmed. This is selectable by changing the local target removal in the desired way.

The details of this process and some process results are presented in this poster.

Keywords

ion beam process

etching

local

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