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Double Layer Lithography and Mask Alignment for Silver/SU-8 Mix Lithography

The purpose of this document is to outline mask alignment procedures for negative lithography involving conducting polymers (particularly a mix of SU-8 and Ag).

Warnings:

- **Never look directly at the lamp. Do not put your hands under the lamp during the exposure.**
- **The lamp contains mercury. In case the lamp breaks-up for any reason, immediately exit the cleanroom (take your suit off in the hall outside) and Call Dr. Kassegne.**

Notes:

- **The lamp is calibrated at channel A to 15 mW/cm^2 intensity and at channel B to 23 mW/cm^2 intensity at 350 nm (I-line).**
- **Check or set the desired exposure time (in seconds) on the left of the UV power source panel. Adjust the thumbwheel switches to set exposure time.**

Procedure:

- **Double layer photolithography consists of two consecutive conventional photolithography steps assisted with mask alignment.**
- **Following the preparation of Silver/SU-8 blend, Silver/SU-8 mixture Photolithography procedure is performed.**
- **Since Ag/SU-8 blend is not transparent after the deposition of 2nd layer, the 1st layer structures might not be clearly visible. To avoid this complication, it is favorable to block the deposition of Silver/SU-8 mixture on the alignment marks which are created after the 1st layer photolithography as shown in Figure .**
- **After spin coating the wafer for 2nd layer, the alignment marks should be released for pre-baking shown in Figure .**
- **1st and 2nd layer masks should be matched through the alignment marks to distinguish**

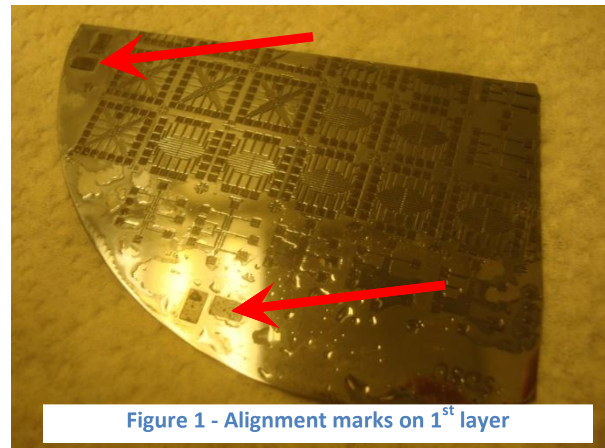

Figure 1 - Alignment marks on 1st layer

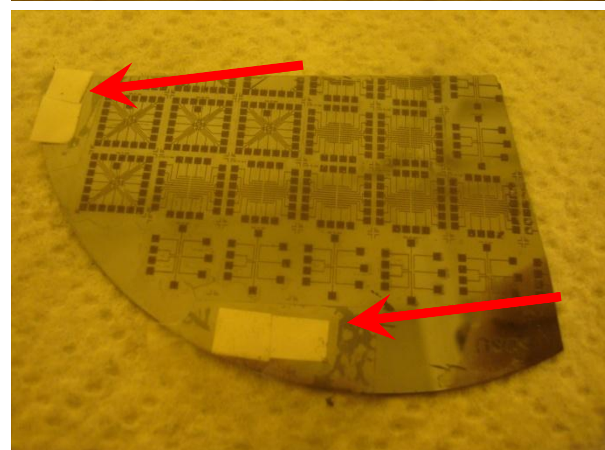

Figure 2 - Blocked alignment marks

top and bottom of the 2nd layer mask.

- The wafer should be placed on the station so that corresponding section of the 2nd layer mask will match with the wafer.
- The detailed positioning can be done either by the mask alignment station positioner (X,Y,Φ) or by manually (Figure and Figure).
- For better alignment the goal should be to prevent any gaps and maintain the perfect match between the alignment marks on the 2nd layer mask and alignment marks created on the 1st layer.
- After the alignment is done, the glass cover should be placed and locked tight carefully.

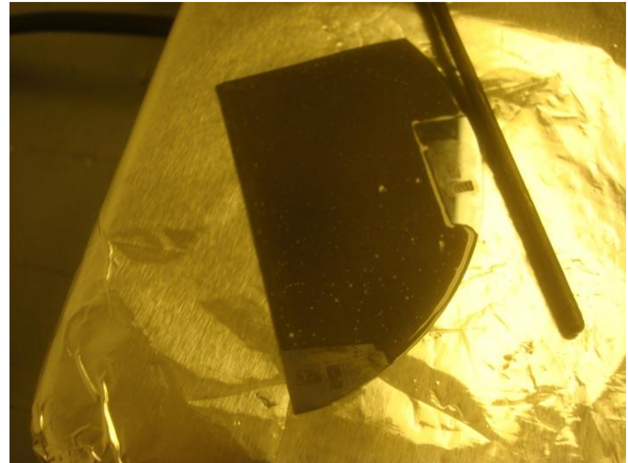

Figure 3 - Pre-baking, alignment mark blocks released

- Before the UV exposure the alignment should be checked again. If the positioning is off, previous 3 steps should be repeated.
- Following the exposure, the required development procedure should be performed (Figure 6).

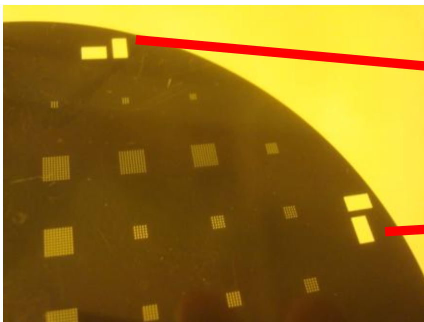

Figure 4 - Alignment marks2nd layer

Figure 5 - Wafer on the alignment station

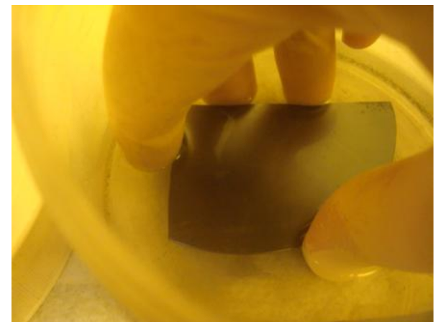

Figure 6 - Development

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