A. Purpose

To transfer the display pattern to the ITO glass.

B. Equipment set-up

Solitec spinner for photoresist coating, and AB-M aligner for UV exposure located in MFF Phase II.

C. Process

Before starting the ITO patterning process, we must have the ITO glass plates cleaned.

1. Photoresist spin coat.

(i) parameter set: pre-spin speed = 960 rpm (display set to 096)
pre-spin time = 5 sec (display set to 050)

spin speed = 4090 rpm (display set to 409)
spin time = 30 sec (display set to 030)

(ii) photoresist coat:

a. Put a piece of ITO glass on the spinner with the ITO coated side up, and then fix it by vacuum.

b. Pour a puddle of HPR 204 (a positive photoresist) onto the center of the glass plate so that the photoresist spread to about 2 inches diameter.

c. Press the "Start" button to begin spinning.

d. Press the "Vac" button to release the glass plate and take it out.

e. Probably, there will be some PR which get around the corners and adhere to the bottom side of the glass. Remove it by clean room wiper with thinner. This is a important step to ensure good exposure on corners.

f. Repeat from step a. to e. for the other glass plates.

2. Pre-bake.

At 105^{o}C for 15 minutes.

3. Clean mask.

While the glass plates are pre-bake, clean the photo-mask at the same time.

(i) Immerse the mask in acetone with ultra-sound on for 2 minutes.

(ii) Immerse in Isopropenol (IPA) with ultra-sound on for 1 minute..

(iii) Rinse in DI water for 4 cycles.

(iv) Blow dry.

(v) Baking at 105^{o}C for 15 minutes.

(vi) Use Isopropenol to clean the mask box too.

4. UV exposure.

(i) Change the chuck with rectangular hole on the aligner. This chuck is specially designed for CDR use.

(ii) Place the mask on the chuck and push the mask tight against the position pins and then turn on the mask vacuum. The mask should be fixed and the meter reading is above 15. Otherwise, release the mask and try again.

(iii) Raise the mask platform.

(iv) Place the glass plate on the center of vacuum chuck with the ITO side up and turn on the vacuum.

(v) Lower the mask platform.
(vi) Align the glass plate with the mask.
(vii) Press the "Chuck" button and raise the glass until the mask and the glass touch. Release the "Chuck" button.
(viii) Set exposure time to 18 seconds.
(ix) Set exposure auto to "ON" position.
(x) Switch the "Light Source" to "Expose".
(xi) After the UV exposure is done, switch the light source to "HOME" position.
(xi) Take out the glass.
(xii) Repeat from step (iii) to (xi) for the other glass plates.

5. Photoresist develop.
   (i) Put the glass plate into the developer solution for 35 seconds at room temperature.
   (ii) Rinse with DI water.
   (iii) Blow dry.
   (iv) Repeat from step (i) to (iii) for the other glass plates.
   (v) Dehydration bake: at 105 ^{o}C for 15 minutes.

6. Hard bake.
   At 120 ^{o}C for 45 minutes.

7. ITO etching.
   (i) Prepare the etching solution by the formula:
   $HCl : H_2O : HNO_3 = 4:2:1$ by volume.
   The concentration of HCl is 36.5%-37.5% and that of HNO_3 is 70%.
   (ii) Immerse the glass plates into the etching solution for 3 minutes at room temperature.
   (iii) Rinse with DI water for 4 cycles.
   (iv) Blow dry.
   (v) Dehydration bake: at 105 ^{o}C for 15 minutes.

8. Photoresist Removal.
   (i) Immerse the glass plates into Acetone for 1 minute with ultra-sound on and then into Isopropenol for another 1 minute with ultra-sound on.
   (ii) Rinse with DI water for 4 cycles.
   (iii) Blow dry.
   (iv) Dehydration bake: at 105 ^{o}C for 15 minutes.

D. Inspection

Pattern should be clearly seen on the glass plates. Check any possible open and short.

E. Equipment shut down

You don't have to turn off any equipment in MFF.