

Randomized ZPs with integrated stops – 08/2018, M. Lebugle

Si chips 3mm x 3mm. 300 μm thickness. Window size 1mm x 1mm with Si₃N₄ 250nm thick PMMA 950K 8% in anisole 1800 RPM.

Dose list with bias 23 nm, bias 23 nm, development time 12s in 7:3 IPA:H₂O, mask_new 40 s, plating with 10 mA current. Outermost zone is **60 nm for all ZPs. Height of gold is >1 microns, Each zone plate center is 300 microns apart** from each other, in both directions. Diameters are indicated in the sketch (not to scale).

The randomized patterns were realized with the ZP code named:

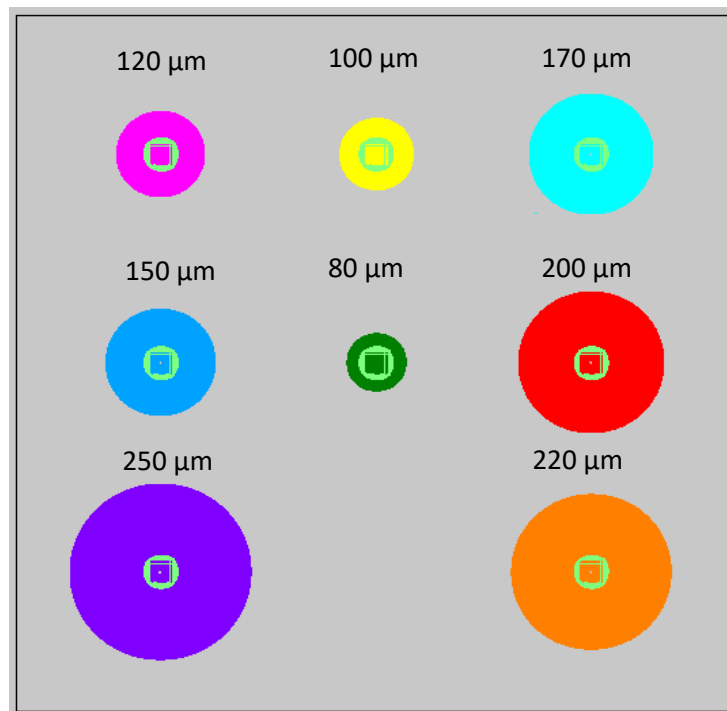
FZP_unified_ZP_May2018.c ; which can be found on pg@b035 machine

Fields for the randomization are also found on pg@b035 computer :

/home/pg/bin/FZP_unified/PtychoZPs/May2018_SecondPtychos

Randomization is $k=3 \text{ } \mu\text{m}^{-1}$, amp=120nm.

ZP have stops are 50- μm diameter except for the 80- μm one that has a 40- μm stop.



Sample #1:

Stop height is a bit shallower, around 18-20 μm

s0: stops present on ZPs with diameter 120, 100, 150, 80, 250 μm . I suspect that there is a hole in the membranes on ZPs 170, 200, 220, μm .

s1: stops present on ZPs with diameter 120, 100, 170 μm . I suspect that there is a hole in the membranes on ZPs 150, 200, μm .

s2: stops present on ZPs with diameter 120, 100, 170, 150, 250 μm .

s3: no stop

s4: all stops are present, except for the 200 μm ZP where there is a hole

s5: all stops are present

s7: all stops are present. Gold stripes are found on ZPs 170, 200, 220 um.

Sample #4

Some overplating, but it is nearly nothing (less than 50nm I think)

Stop height is a bit shallower, around 14-17 um

s0: stop present on ZP with diameter 120 um.

s1: no stop

s3: no stop

s4: stops present on ZPs with diameter 150, 80, 250, 220 um.

s5: no stop

s6: all stops are present

SEM images on

XRO:\Maxime\2018.05 Ptychos4All\2\1 with CS

XRO:\Maxime\2018.05 Ptychos4All\2\4 with CS