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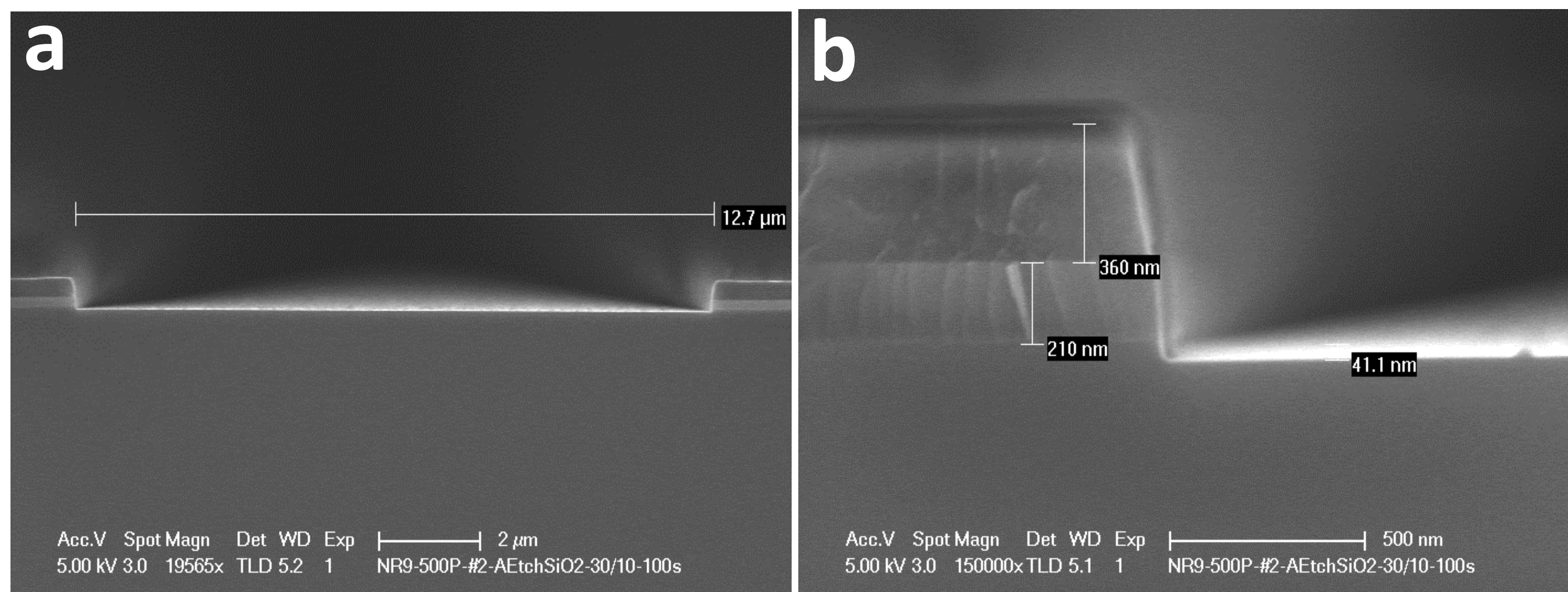
If you etch some compound semiconductor EPI-layer samplers using Unaxis PM1 etcher with the chlorine-based chemistry, do not use the dry etch recipe with the oxygen in it to etch your dielectric etch masks (SiO_2 and SiN_x) because it will cause a big roughness of your etched bottom surface (micro-disc effects).

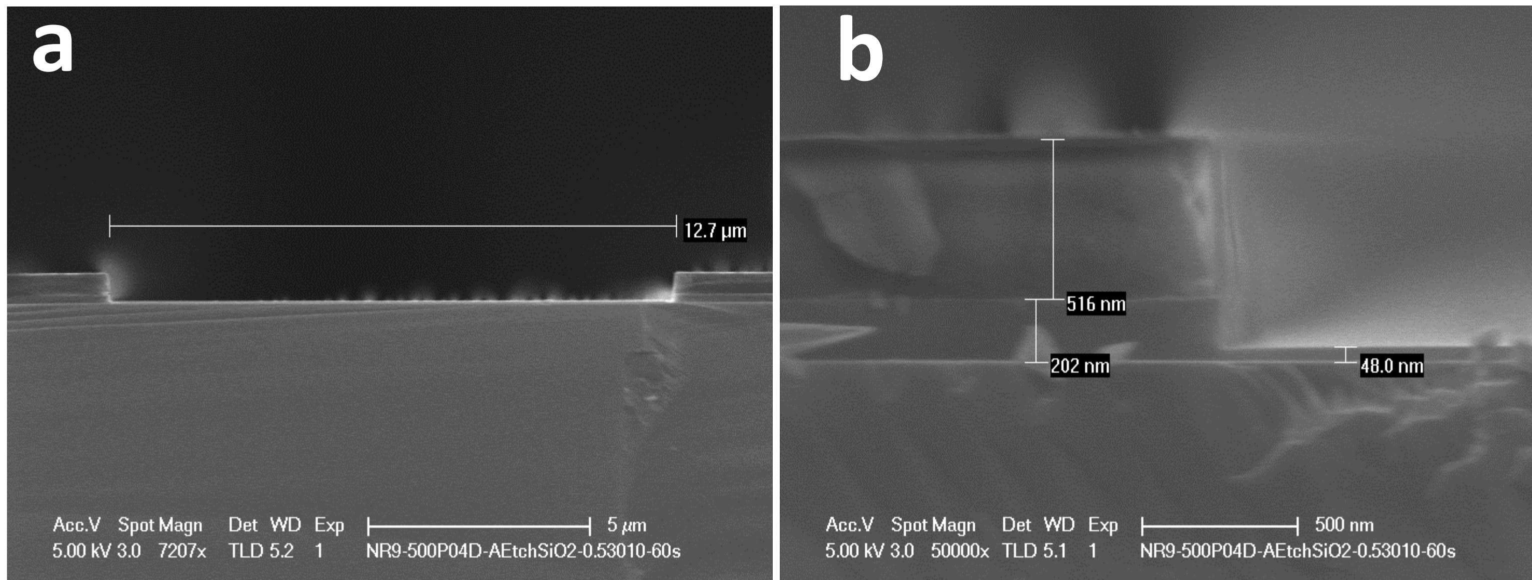
SiO_2 Etch (ICP#2): 0.5Pa, 50/900W, CF_4/CHF_3 Flow-Rate=30/10 SCCM, **Etch Rate=152 nm/min, Etch Selectivity (SiO_2/PR)=1.0**

Figure 1 (a) and (b) SiO_2 etch profile (etch time=100 seconds). PR etch mask remains on the top of the etched SiO_2 layer.



Note: It is over-etched (the etching went through the SiO_2 layer and into the underneath Si). The averaged Si etch depth and remaining resist thickness are 48.4 and 367 nm, respectively.

Figure 2 (a) and (b) SiO2 etch profile (etch time=60 seconds). PR etch mask remains on the top of the etched SiO_2 layer.



Note:

1) The averaged remaining resist thickness is 0.512 µm.

2) The averaged remaining SiO_2 thickness is 47.8 nm.

3) The SiO_2 etch rate is 152 nm/min.

4) The etch selectivity (SiO_2/resist) is 1.00.

5) The averaged Si etch rate is 138 nm/min.

Figure 3 SiO_2 etch profile (ARC-11 remains on the top after the etching). The etch pattern was created using Holography.