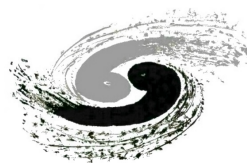
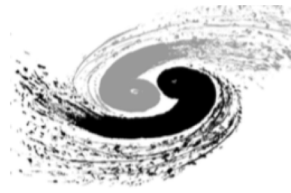


Sensor Design Update



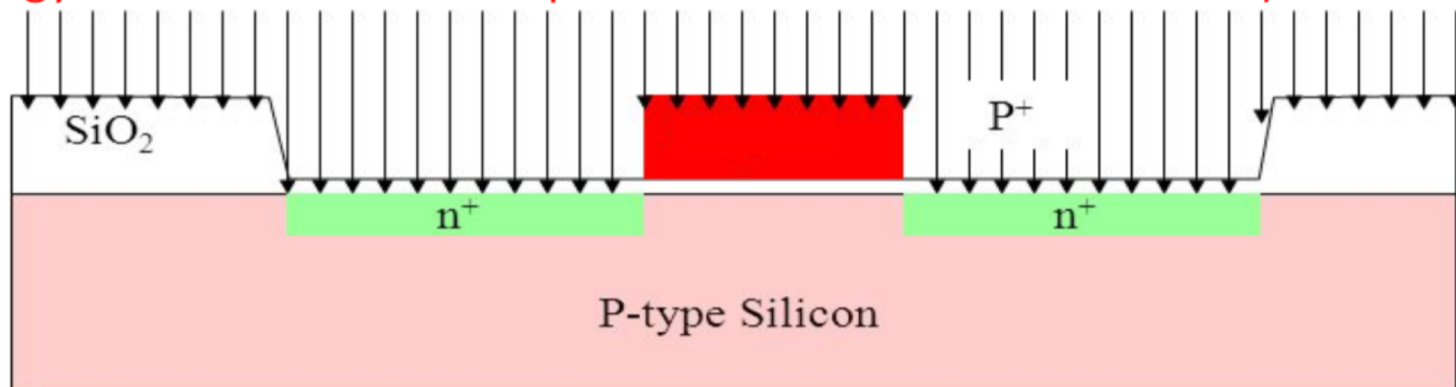
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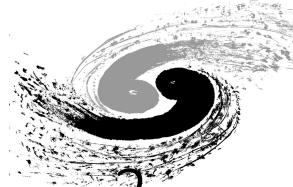
WU Kewei
2019/05/30



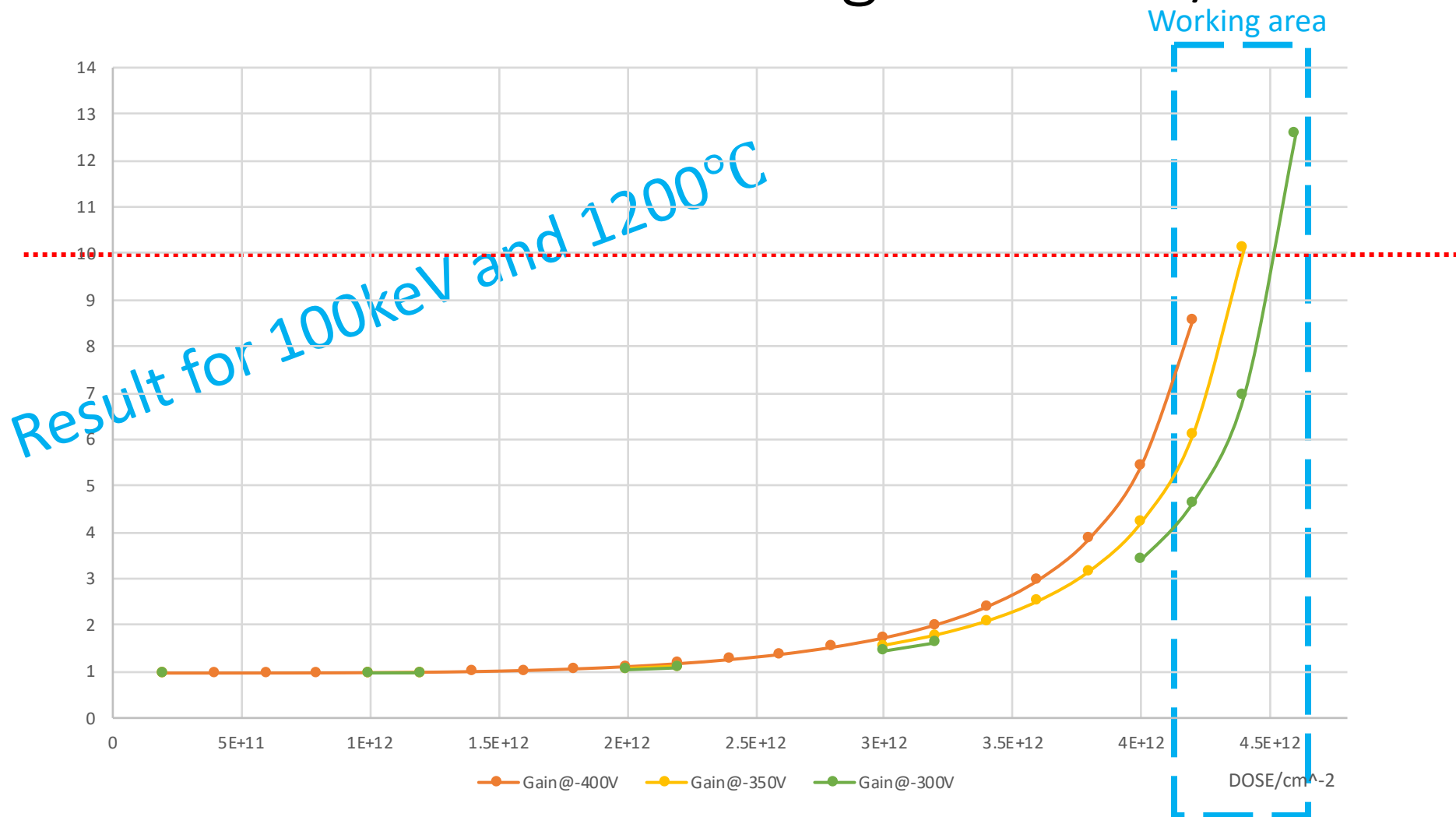
Process

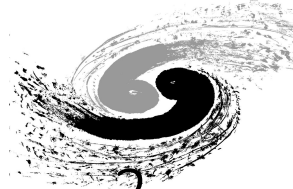
1. Implant **Phosphorus** with N-JTE and WN-ring mask (dose= $4 \times 10^{13} \text{ cm}^{-2}$ energy= 100 keV 😬 diffuse temperature= 1200 C time= 10.0 min)
2. Implant **Boron** with P-stop and DC-stop mask (dose= $2 \times 10^{14} \text{ cm}^{-2}$ energy= 40 keV diffuse temperature= 1200 C time= 10.0 min)
3. Implant **Boron** with P⁺ layer mask (dose= **???** cm^{-2} energy= 100 keV 😬 diffuse temperature= 1200 C time= 60.0 min)
4. Implant **Phosphorus** N⁺⁺ layer with mask (dose= $1 \times 10^{15} \text{ cm}^{-2}$ energy= 40 keV no diffusion)
5. Implant **Boron** from back without mask (dose= $1 \times 10^{15} \text{ cm}^{-2}$ energy= 40 keV diffuse temperature= 1050 C time= 10.0 s)



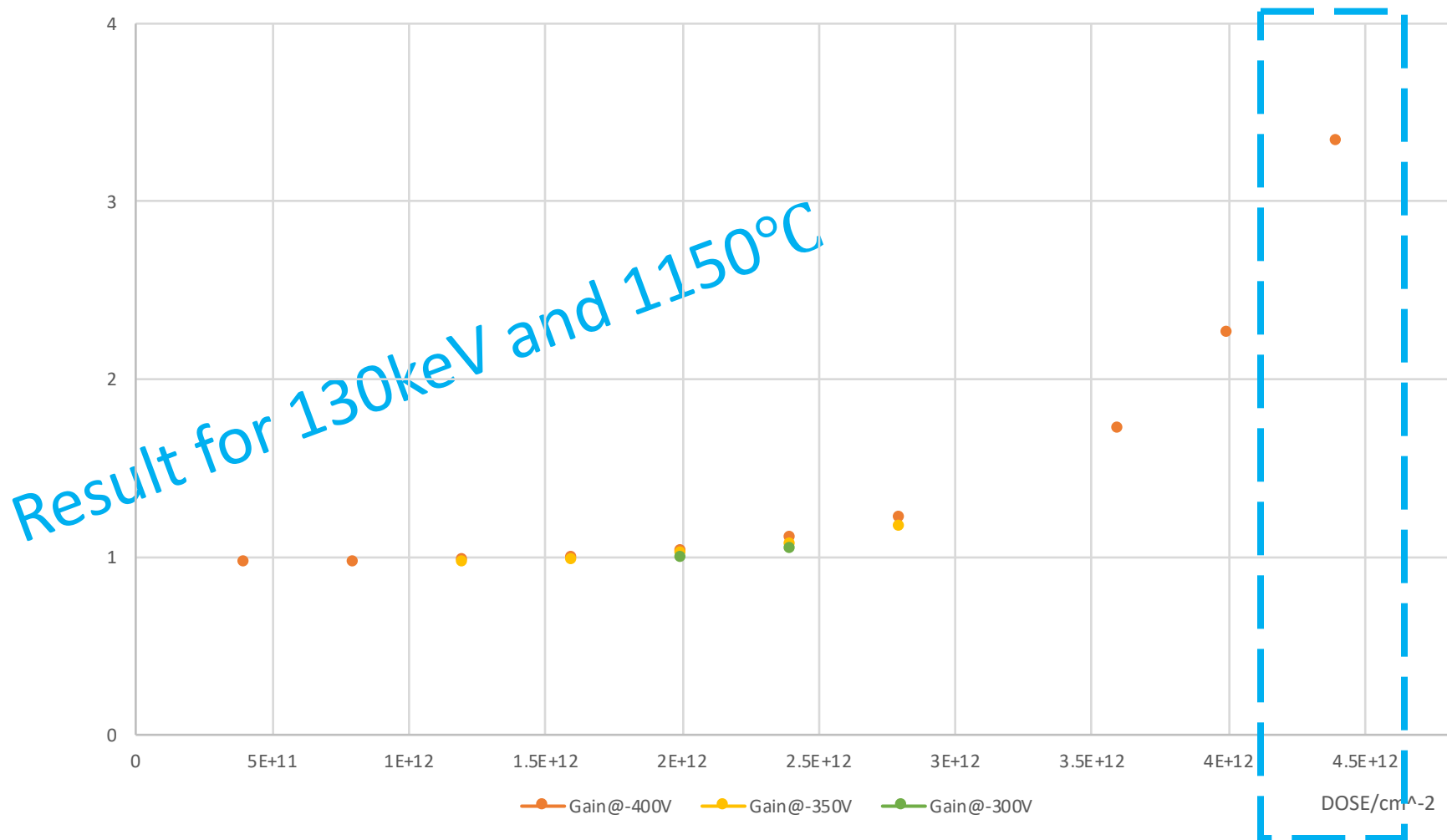


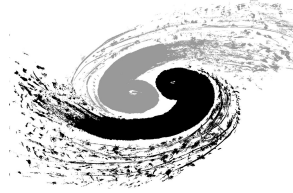
Gain at Different Voltage vs Dose/cm⁻²



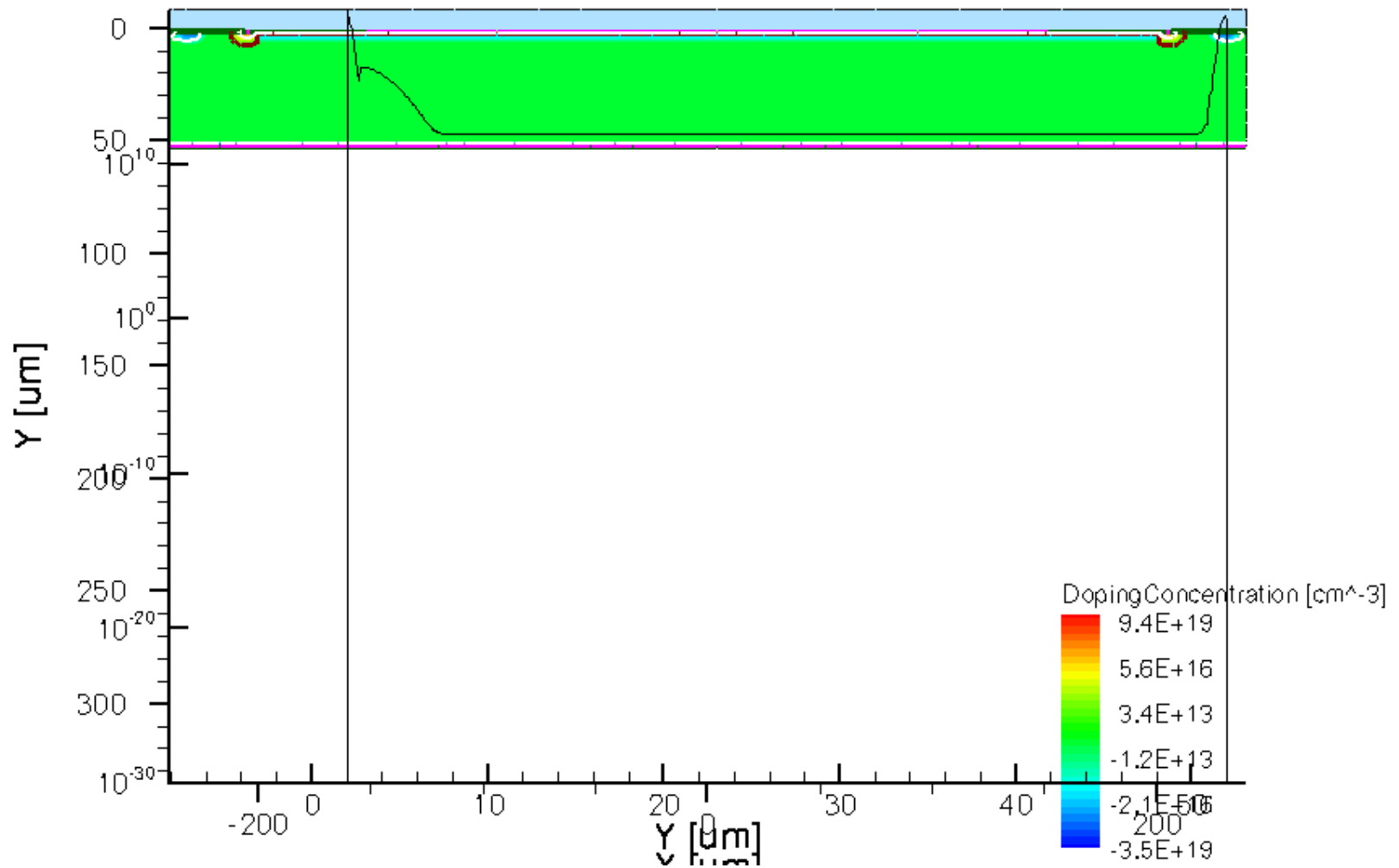


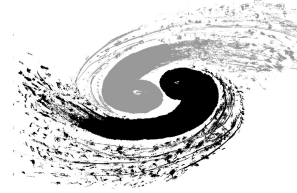
Gain at Different Voltage vs Dose/cm⁻²



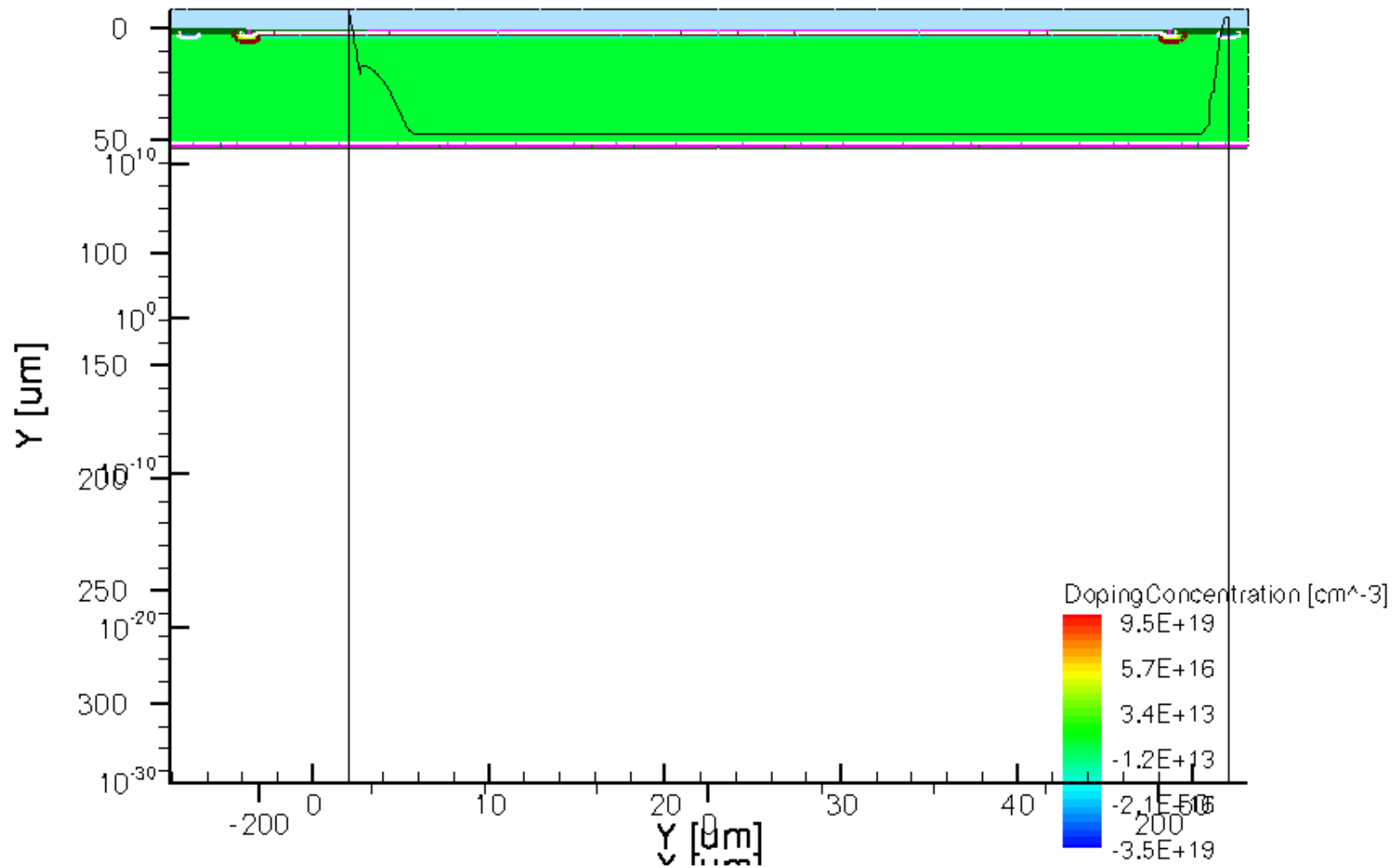


4e12cm⁻²_100keV_1200°C





4e12cm⁻²_130keV_1150°C



Number of Implants:

1

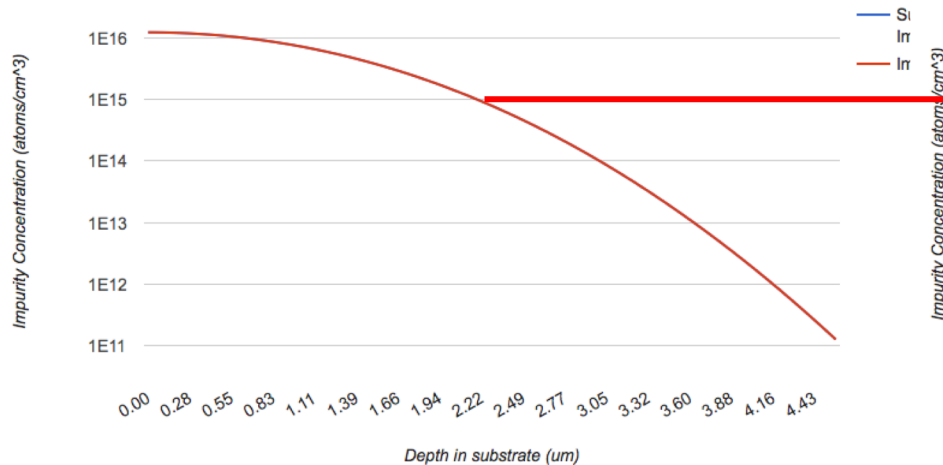
Number of Implants:

1

Dopant: ☐ Arsenic ☒ Boron ☐ Phosphorus	Diffusion Temperature: 1200 [°C]	Diffusion Time: 60 [minutes]
Implant 1 Ion Energy: 130 [keV] (0-400) Ion Dose: 3e12 [ions/cm ²]		

Substrate Depth (x):	50 [μm]
Calculate Concentration	
CSV	
Ion Concentration at x:	0 [atoms/cm ³]

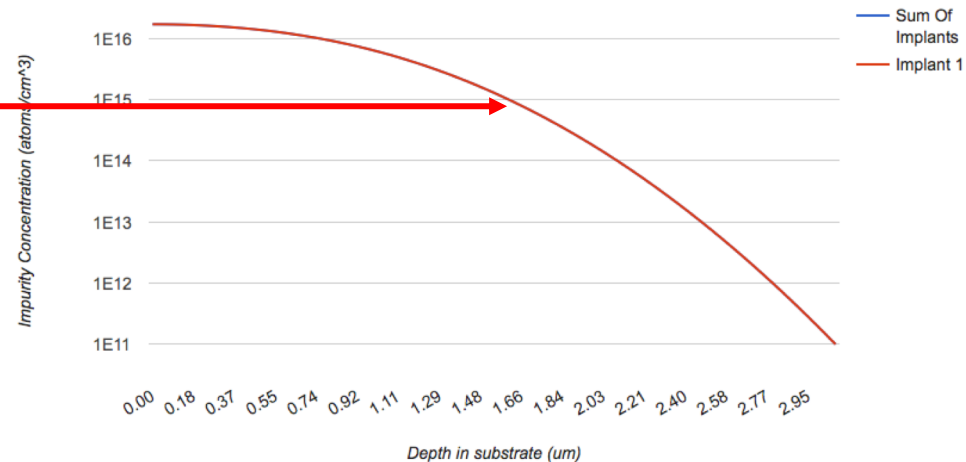
Impurity Concentration vs. Substrate Depth
for above Parameters



Dopant: ☐ Arsenic ☒ Boron ☐ Phosphorus	Diffusion Temperature: 1150 [°C]	Diffusion Time: 60 [minutes]
Implant 1 Ion Energy: 130 [keV] (0-400) Ion Dose: 3e12 [ions/cm ²]		

Substrate Depth (x):	50 [μm]
Calculate Concentration	
CSV	
Ion Concentration at x:	0 [atoms/cm ³]

Impurity Concentration vs. Substrate Depth
for above Parameters



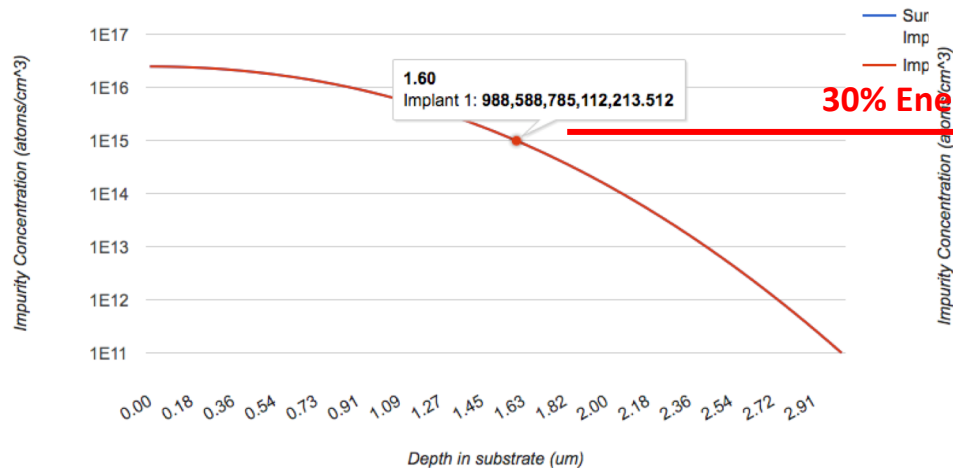
Number of Implants:

1

Dopant: ☐ Arsenic ☒ Boron ☐ Phosphorus	Diffusion Temperature: 1150 [°C]	Diffusion Time: 60 [minutes]
Implant 1		
Ion Energy: 100 [keV] (0-400)		
Ion Dose: 4e12 [ions/cm ²]		

Substrate Depth (x): 50 [μm]
Calculate Concentration CSV
Ion Concentration at x: 0 [atoms/cm ³]

Impurity Concentration vs. Substrate Depth for above Parameters



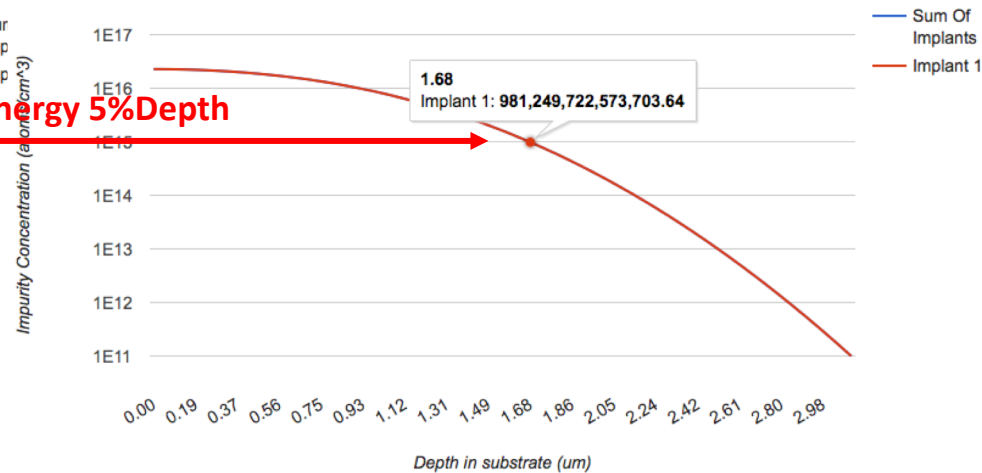
Number of Implants:

1

Dopant: ☐ Arsenic ☒ Boron ☐ Phosphorus	Diffusion Temperature: 1150 [°C]	Diffusion Time: 60 [minutes]
Implant 1		
Ion Energy: 130 [keV] (0-400)		
Ion Dose: 4e12 [ions/cm ²]		

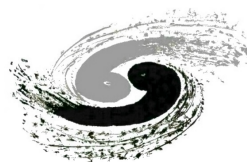
Substrate Depth (x): 50 [μm]
Calculate Concentration CSV
Ion Concentration at x: 0 [atoms/cm ³]

Impurity Concentration vs. Substrate Depth for above Parameters



30% Energy 5%Depth

Thanks for your listening!



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