Electrically active defects in 4*H*-SiC

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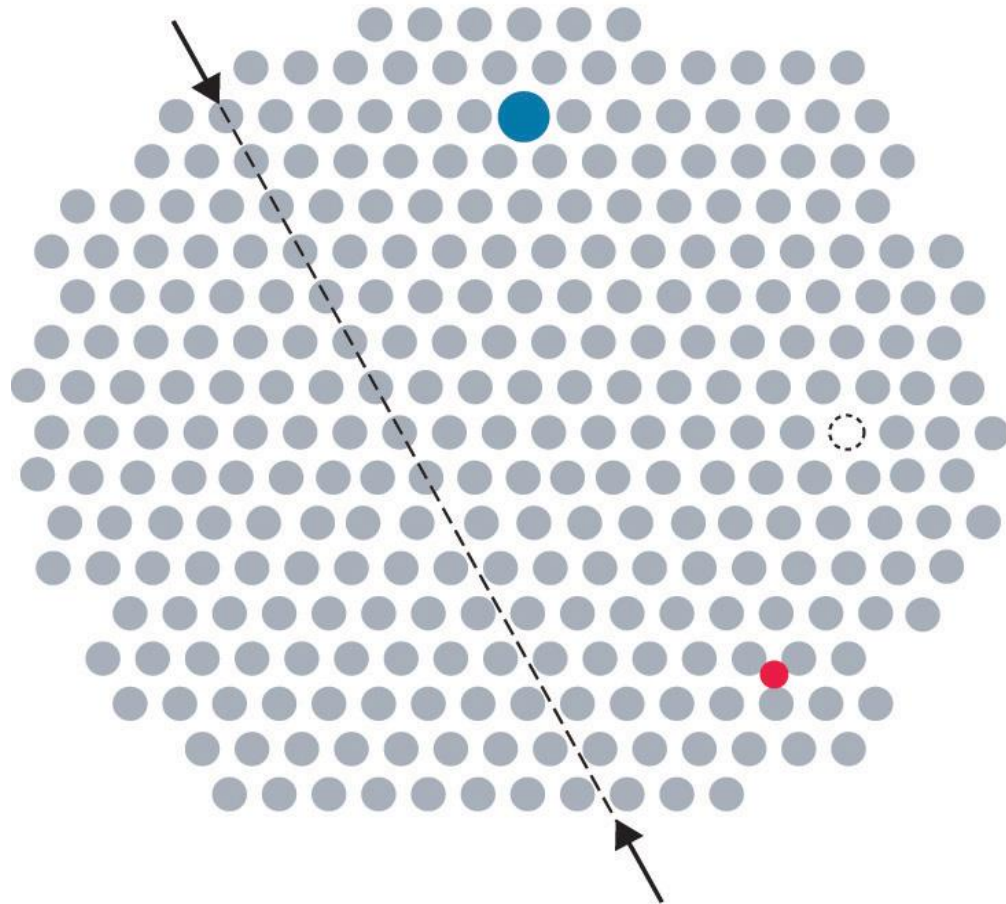
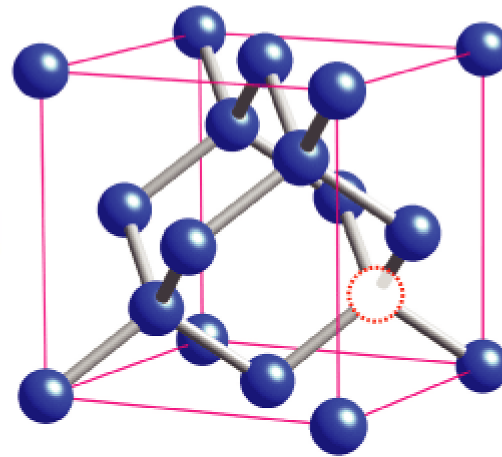
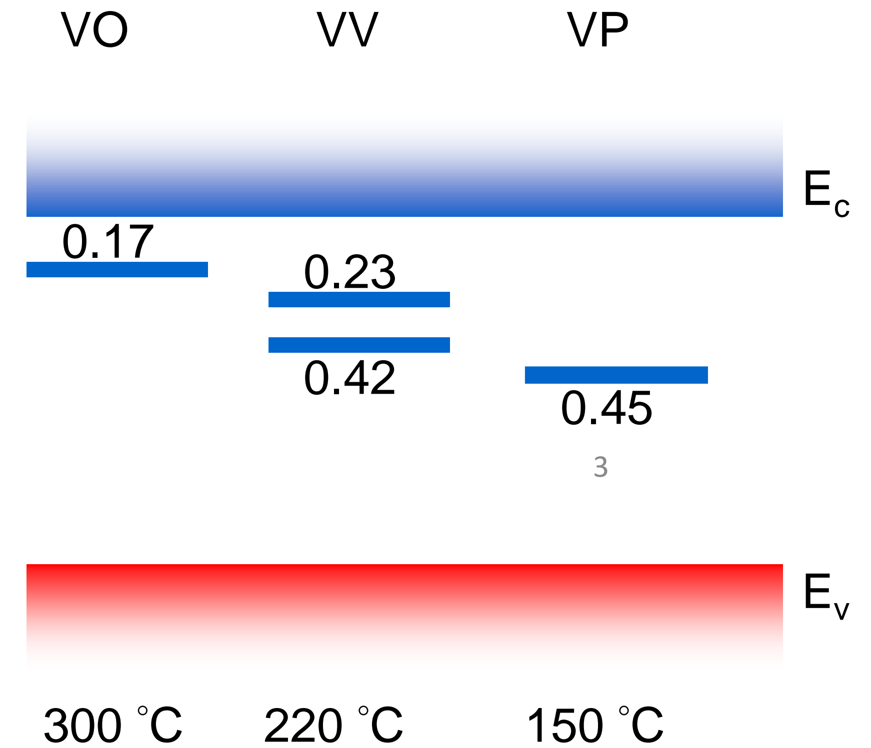
Outline

- Introduction {Radiation induced damage – Deep level transient spectroscopy}
- Recent study {Double negatively charged carbon vacancy in 4*H*-SiC}
- Conclusions

Defects – electrically active

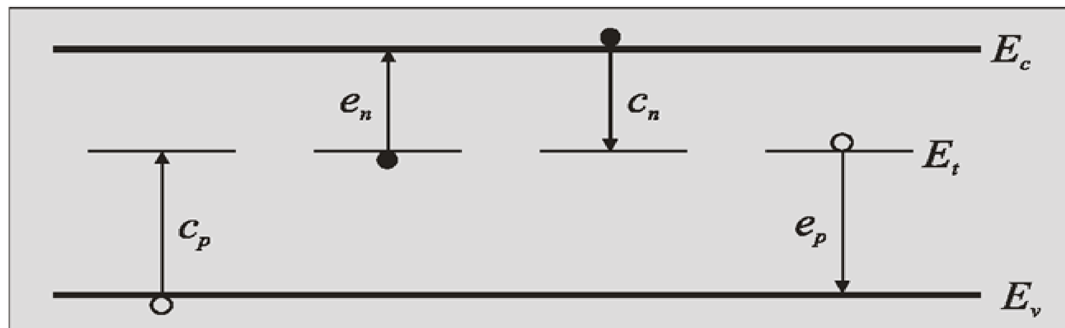


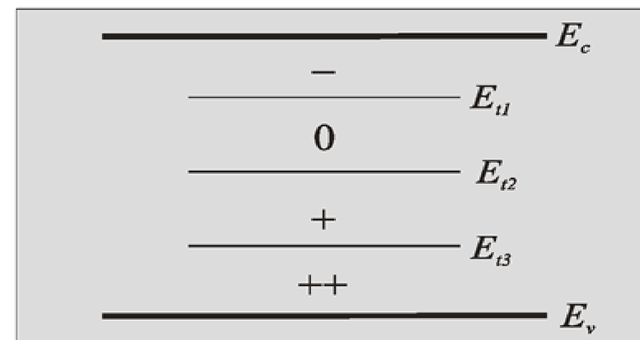


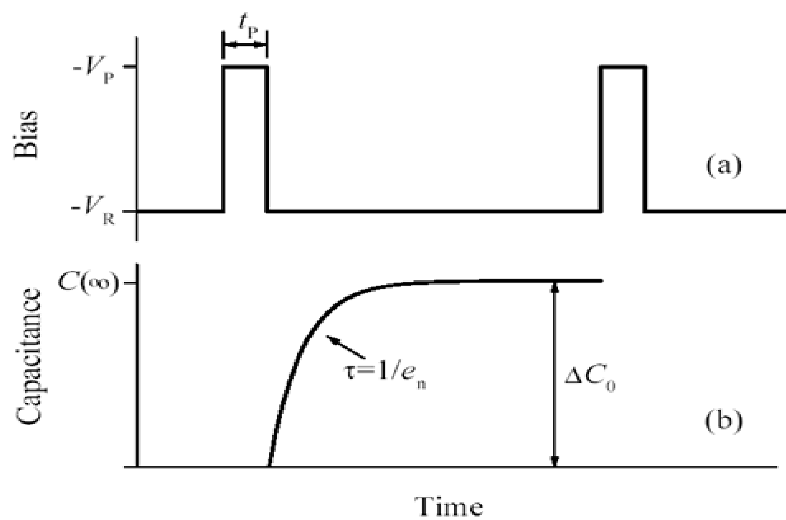


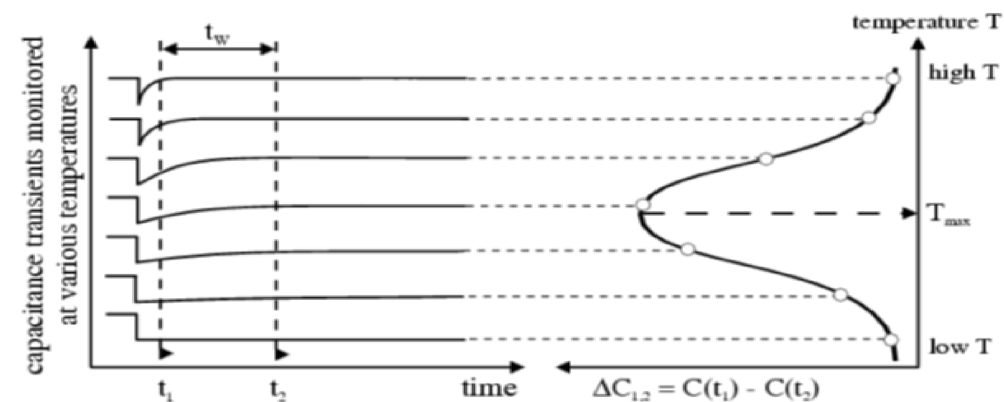
n-type Si

Conventional DLTS

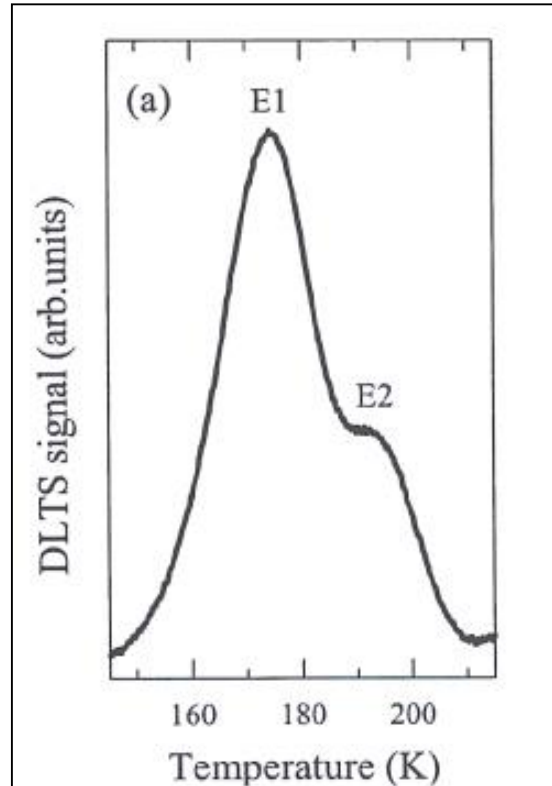




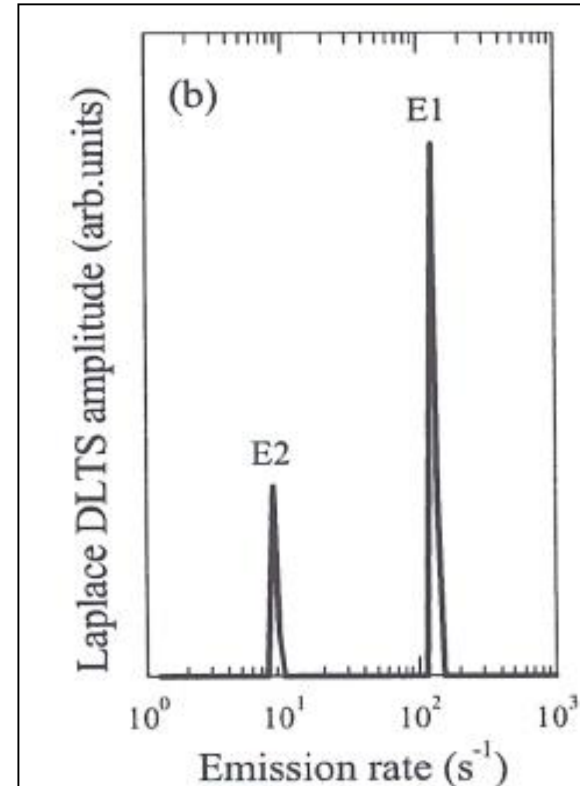




Laplace DLTS



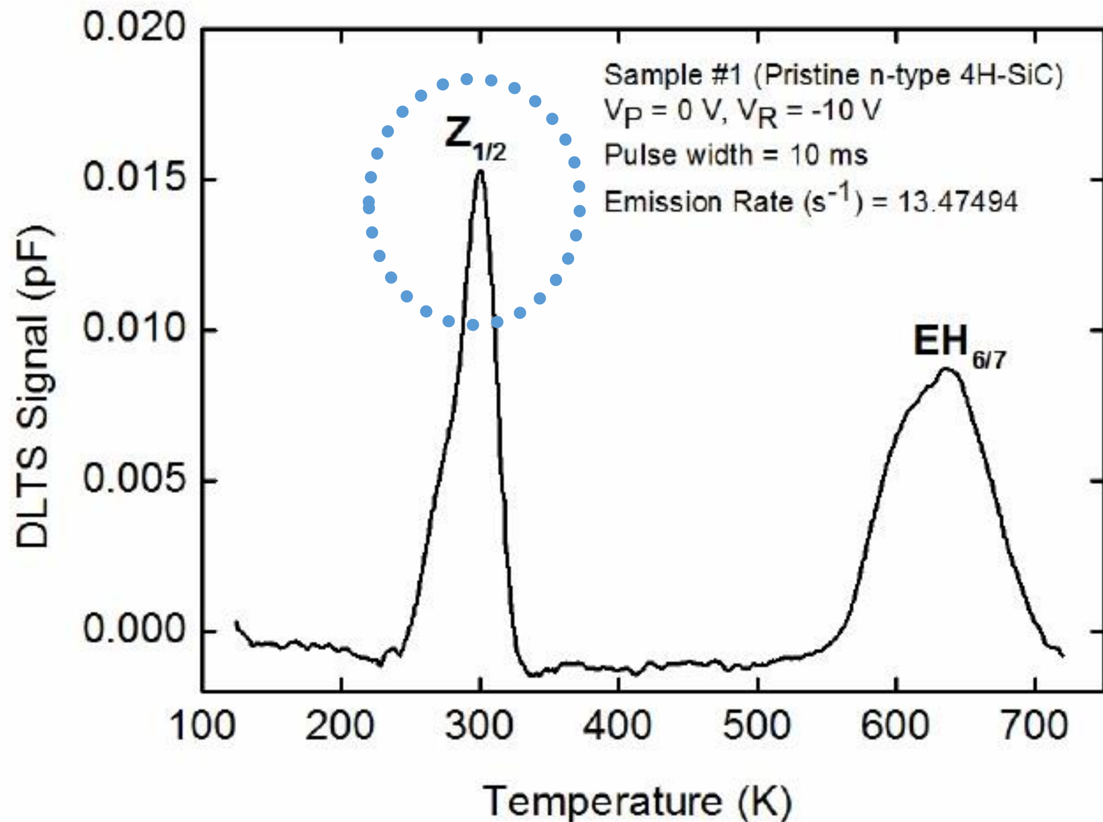
[DLTS]



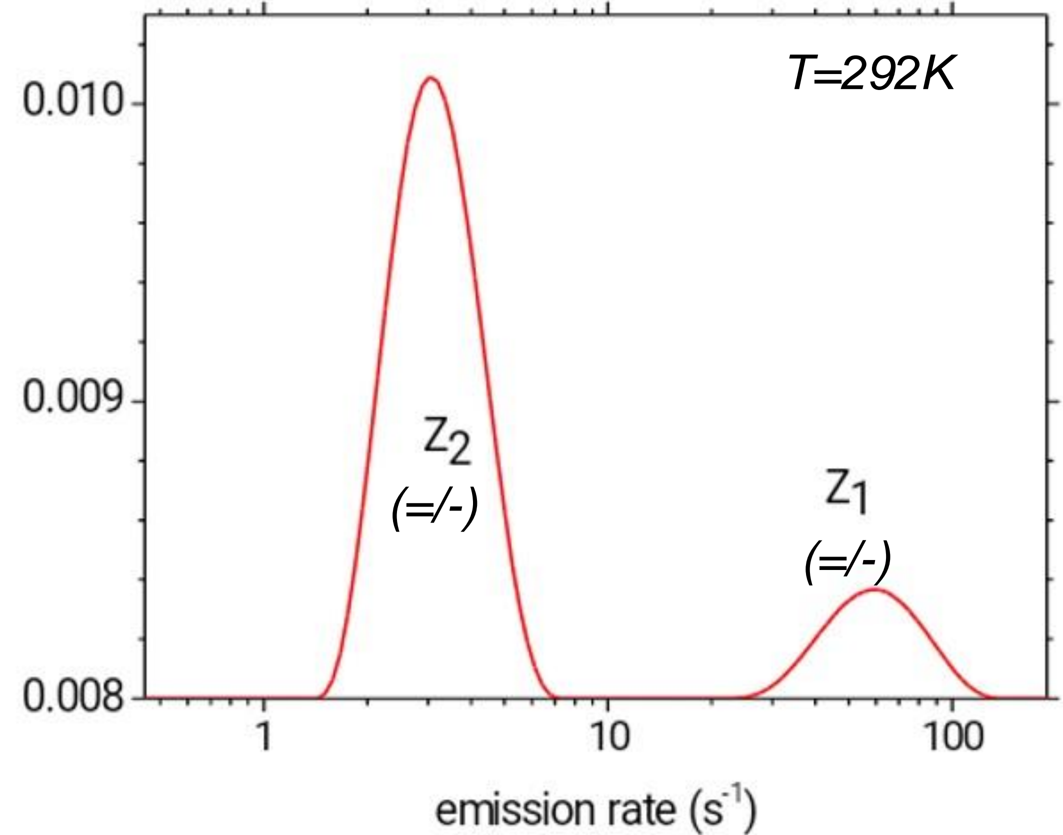
[Laplace DLTS @ 170K]

4H-SiC

Z1/2 is carbon vacancy (Vc) – the major "lifetime killer" in SiC

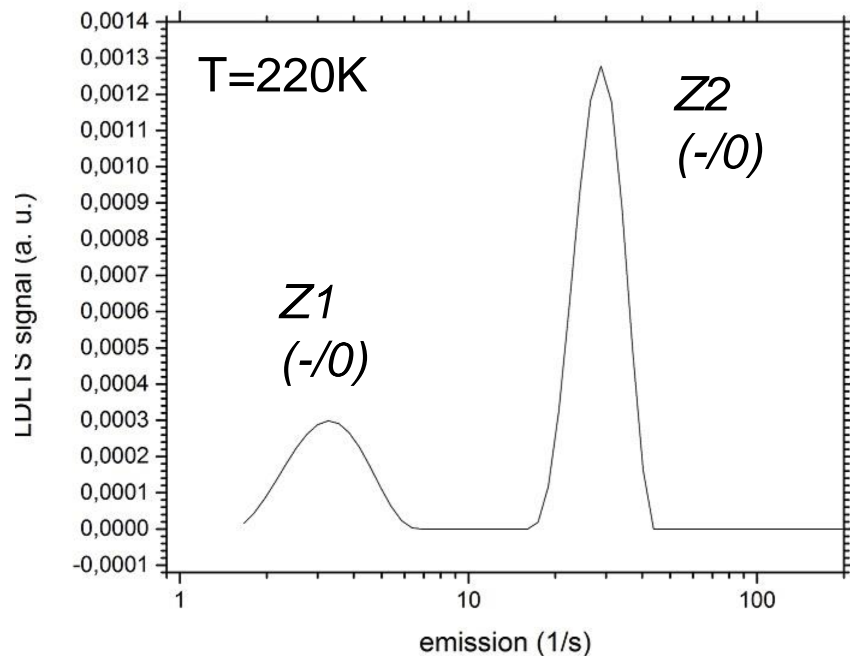


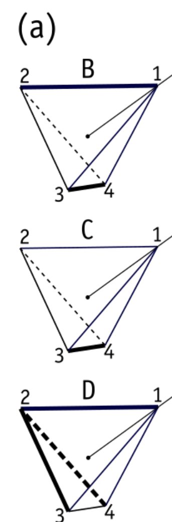
DLTS

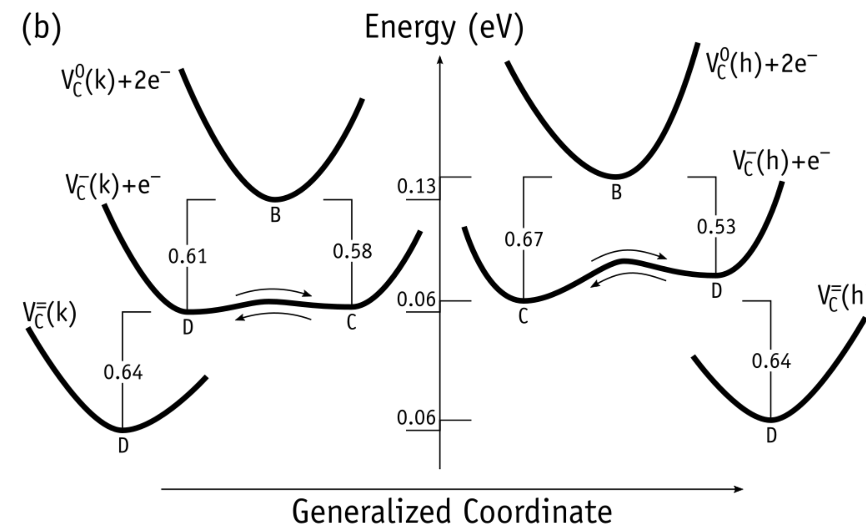


Laplace DLTS

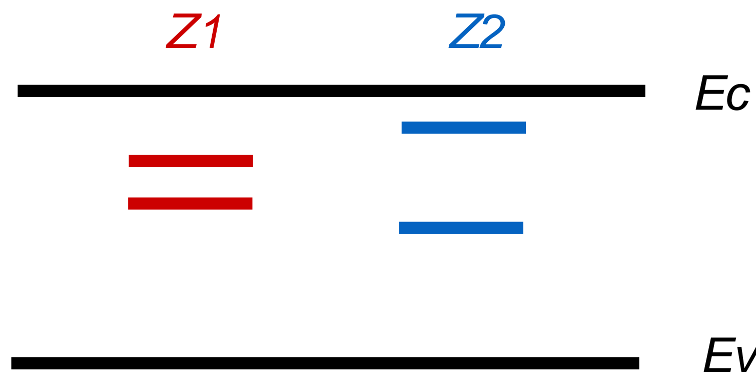
Negative-*U*



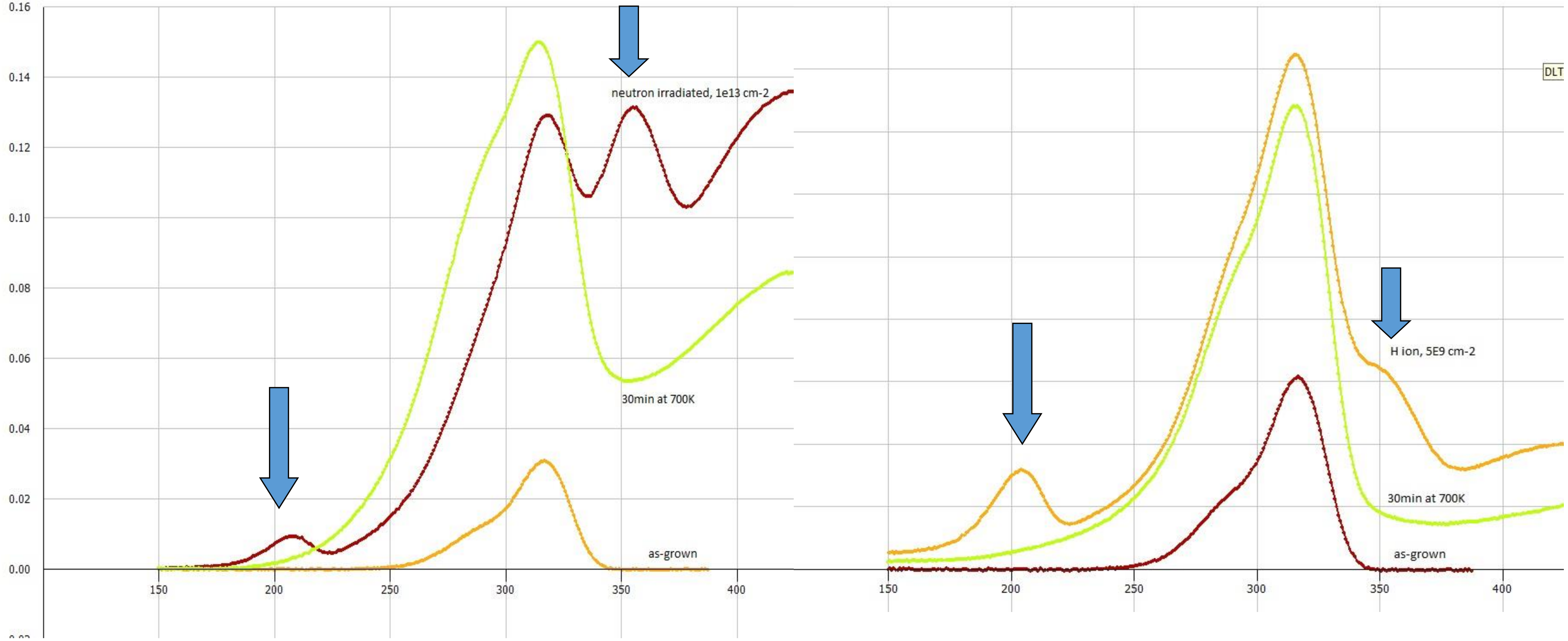




Z1	E (eV)	σ (cm2)
(-/0)	0.52	2E-14
(=/-)	0.58	3E-15



Z2	E (eV)	σ (cm2)
(-/0)	0.42	6E-16
(=/-)	0.67	5E-15


Fast neutron irradiation, 1e13 cm-2
600 keV H, 5e9 cm-2
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
150
200
250
300
350
400
neutron irradiated, 1e13 cm-2
30min at 700K
as-grown
DLT
H ion, 5E9 cm-2
30min at 700K
as-grown
Low-temperature annealing; 700K

E-SiCure project team

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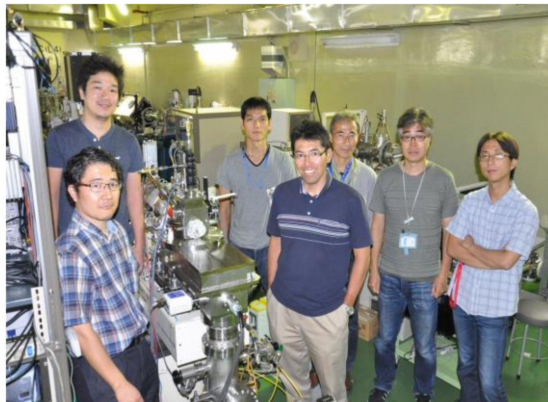
Jozef Stefan Institute
Slovenia

University of Aveiro
Portugal



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