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Destructive Failures of Micron 8-Gbit NAND-Flash Memory Devices.

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1. Test Runs with Kr, Vacuum, LET = 32

DUT#	Test Mode	Flux [$cm^{-2}s^{-1}$]	Fluence [cm^{-2}}	Fluence at DF occur-rence [cm^{-2}]	Remarks
MC2-3	M5	1.0E3	3.0E5	./.	
		2.0E3	6.0E5	./.	
		6.0E3	1.0E7	./.	Device Timeout
		6.0E3	3.0E6	./.	
		Σ	1.4E7	./.	
MC2-4	M5	6.0E3	9.7E6	./.	Device Timeout
MC2-5	M5	6.0E3	1.2E7	./.	Device Timeout
		2.0E4	1.0E7	./.	Device Timeout
		Σ	2.2E7	./.	
MC2-10	M5	7.0E3		2.1E6	
					σ_DF = n_DF/F_average = 1 / 4.78E7 cm^{-2} = 2.1E-8 cm^2

2. Test Runs with Kr, Vacuum, Kapton Foil, LET = 35

DUT#	Test Mode	Flux [$cm^{-2}s^{-1}$]	Fluence [cm^{-2}}	Fluence at DF occur-rence [cm^{-2}]	Remarks
MC2-7	M5	7.0E3		6.3E5	
MC2-9	M5	6.0E3	1.0E7	../.	without Kapton foil
				1.14E7	with Kapton foil
MC2-15	M5	5.5E3	1.0E7	./.	without Kapton foil
		5.8E3		1.07E7	with Kapton foil
					For F_average only the fluences at LET = 35 are taken into accoiunt
					σ_DF = n_DF/F_average = 3 / 2.73E6 cm^{-2} = 1.1E-6 cm^2

3. Test Runs with Xe, Vacuum, LET = 60

DUT#	Test Mode	Flux [$cm^{-2}s^{-1}$]	Fluence [cm^{-2}}	Fluence at DF occur-rence [cm^{-2}]	Remarks
MC2-16	M1, 85°	3.0E1		4.0E3	Most DF sensitive condition
MC2-20	M5	1.0E2		4.4E4	
MC2-21	M1	1.0E2		2.8E4	
					σ_DF = n_DF/F_average = 3 / 3.85E4 cm^{-2} = 1.0E-4 cm^2

4. Rough DF Cross Section

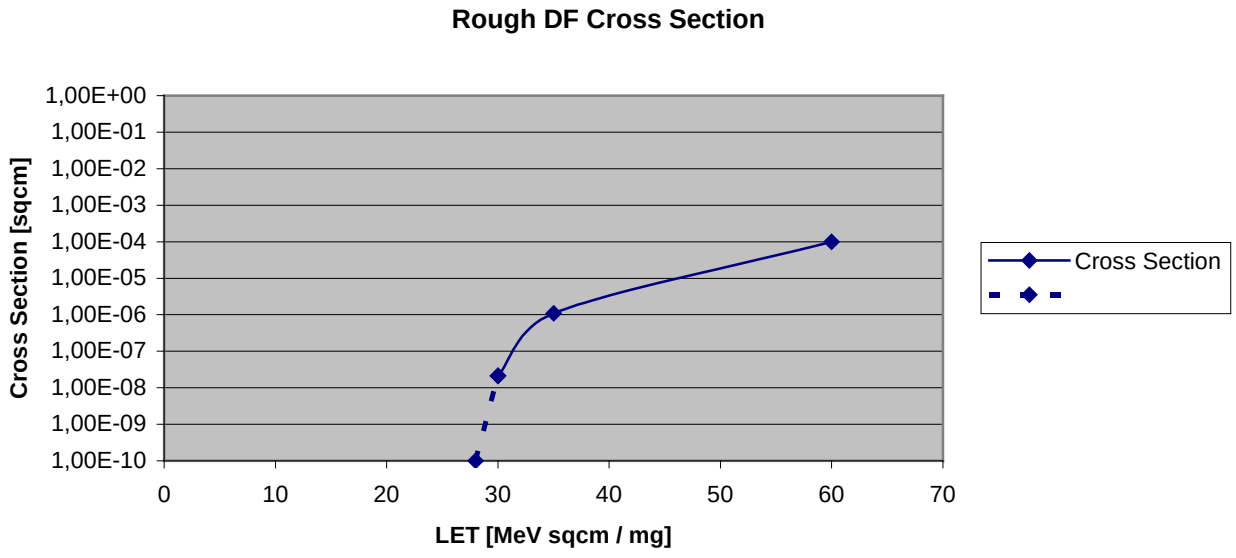

Fig. 4.1: Rough DF Cross Section, Micron 8-Gbit NAND-Flash