Electronic Supplementary Information for
A Two-Faced "Janus" Unimolecular Rectifier Exhibits Rectification Reversal

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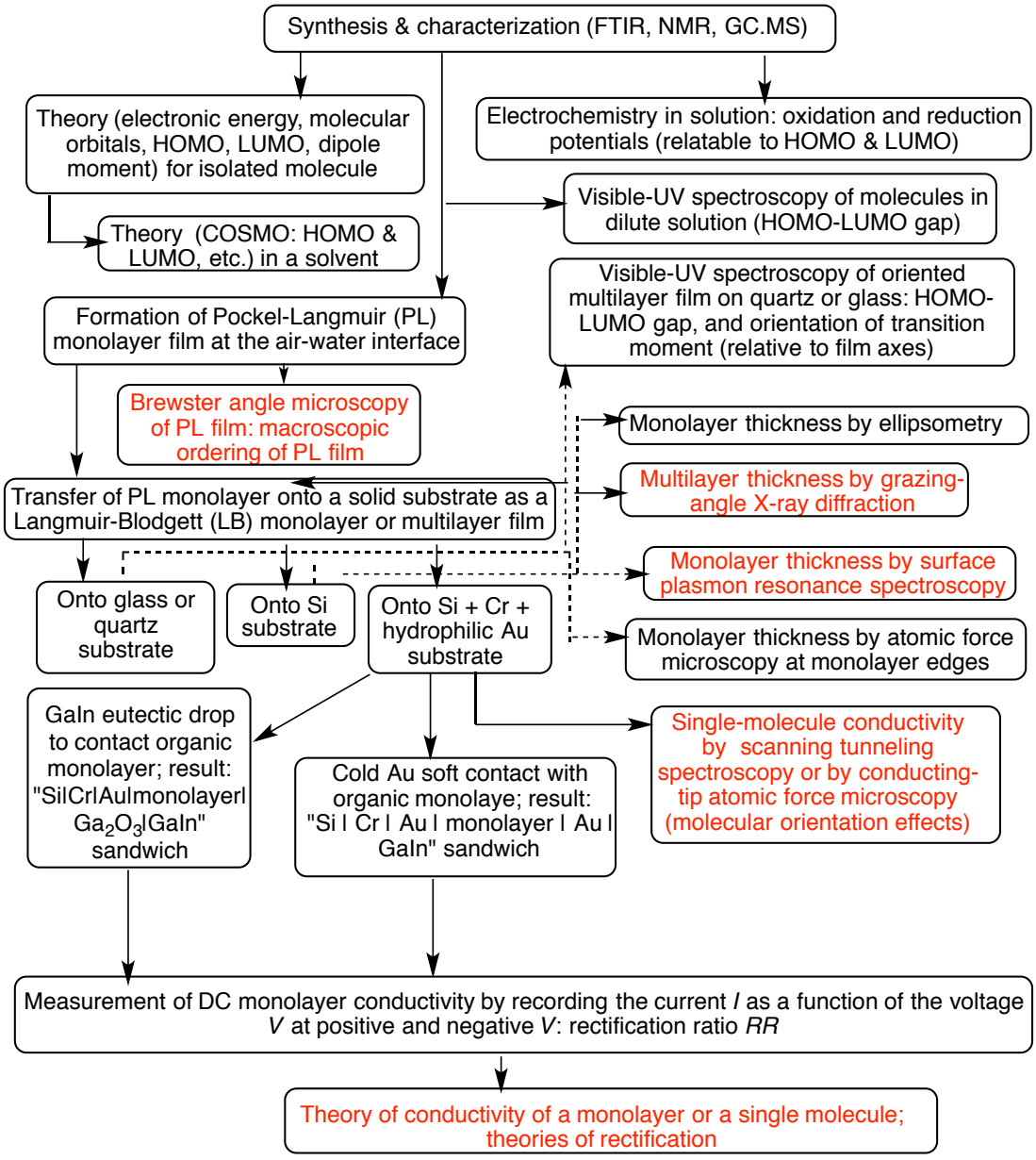

Fig. A1. Flowchart of theory and experiment. In red are the experiments not done in the present study.

Table A. Theoretical results

Orb. No.	Orbital Label	DFT Energy (eV)	Relative Energies (eV)
288	LUMO+5	-1.37	
287	LUMO+4	-1.81	
286	LUMO+3	-1.96	
285	LUMO+2	-2.22	
284	LUMO+1	-2.47	
283	LUMO	-3.93	LUMO is 1.58 eV above HOMO LUMO is also 2.43 eV above HOMO-1 (λ=506 nm); oscillator strength f= 0.83
282	HOMO	-5.51	
281	HOMO-1	-6.38	
280	HOMO-2	-6.39	
279	HOMO-3	-7.04	
278	HOMO-4	-7.15	
277	HOMO-5	-7.16	

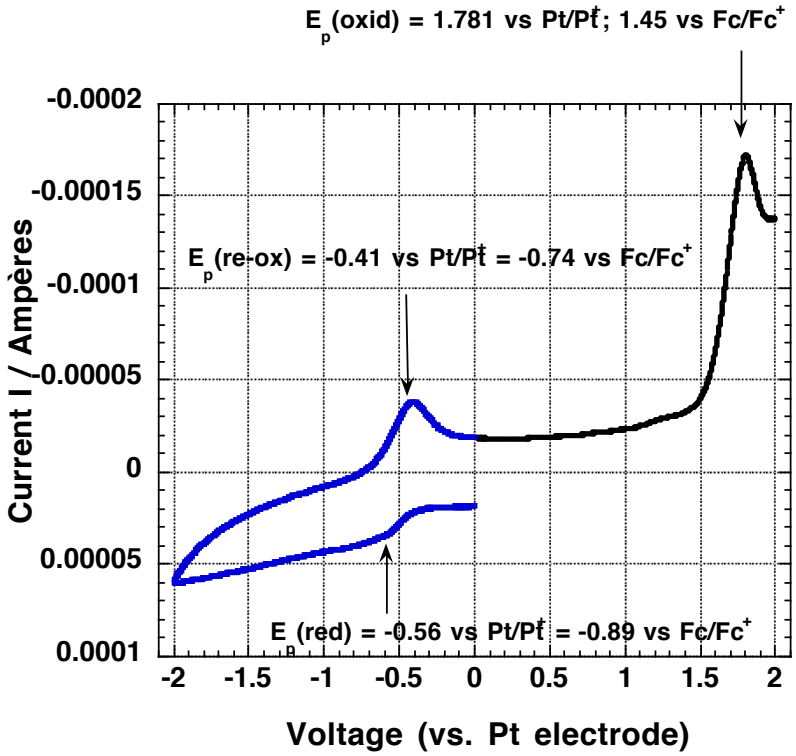

Fig. A2. Cyclic voltammogram of a drop-coated film of **1** in a solution of 0.1 M $LiClO_4$ in CH_3CN, using a Ag wire quasi-reference electrode; the potentials are also reported vs. the Fc^+/Fc redox couple.

The surface pressure-area (∏-A) isotherm of **1** (**Fig. 5**) differs in detail from those of structurally simple amphiphiles (such as arachidic acid, which shows reproducible transitions from liquid-expanded to liquid-compressed to solid monolayer phases: these transitions are temperature- and pH-dependent [55]). Reddish molecules of **1** were dissolved in $CDCl_3$ (1 mg mL^{-1}, 3.67×10^{-3} M). Since PBIs can self-

associate in π-π stacks [56], it was not too surprising to find that the isotherms of **1** depended on how the solution was dropped onto the water surface (**Fig. B1**).

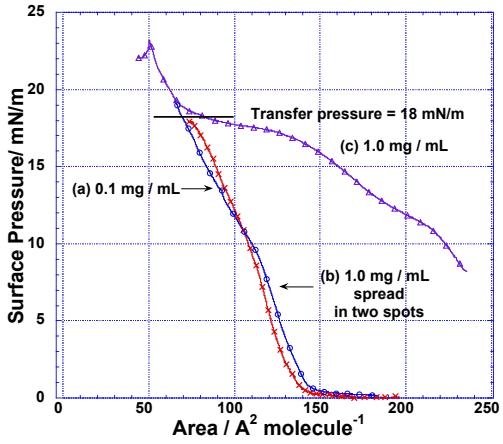

Fig. B1. Pressure-area isotherm (PAI) of **1** at 10°C. **(a)** (Crosses): Dilute solution: 100 μL 0.1 mg/mL: this is the isotherm with no pre-association. **(b)** (Circles): 120 μL (1 mg/mL) added in two spots, 80 μL to the left of the Wilhelmy plate and 40 μL to its right. **(c)** (Triangles): 100 μL 1 mg/mL) added in multiple droplets all over the trough created many small monolayer domains, A surface pressure of 18 mN/m was used for LB transfers (horizontal line).

Depending on how the solution was added to the trough, the film could start in either an expanded state (isolated molecules) or in a pre-associated compressed state (π-π stacked molecules with no slide-slippage, known as H-aggregates). When a more dilute solution (0.1 mg/mL, **Fig. B1** crosses) was used, a reversible isotherm was seen: the surface pressure ∏ rose from zero at around the zero-pressure area A_0 = 150 Å^2/molecule. When a more concentrated solution of 1.0 mg/mL (**Fig. B1** triangles) was used, the pressure ∏ would become non-zero at A_0 > 300 Å^2/molecule. In several runs not shown here (details of how many drops of solution were dropped where on the trough), the pressure would become non-zero at intermediate areas between A_0 = 150 and A_0 = 300 Å^2/molecule, and pale-red 2D islands could be seen in different parts of the trough: the eccentric placement of the Wilhelmy plate made it register a finite pressure due to "islands" of monolayer, connected to each other or not.

The PAIs were reversible up to 15 mN/m: neither 2D aggregation (coalescence) nor 3D buildup was seen. Above 15 mN /m, the slope of the ∏-A isotherm would decrease: the monolayer underwent 2D aggregation and the small pink islands began to coalesce: this corresponds to the plateau in **Fig. B1(c)**, but by visual inspection, the monolayer still had gaps between the islands. At around 22 mN/m and ca. 50 Å^2/molecule, 3D aggregation started: the edges of the pink floating islands became darker.

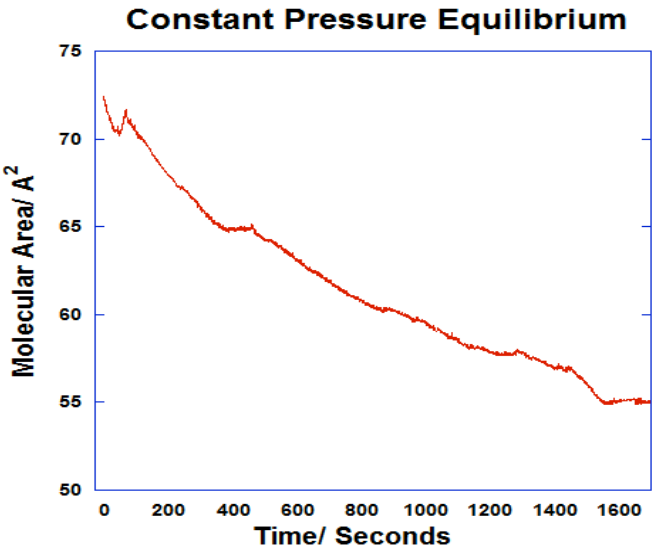

Figure B2. Decrease of Pockels-Langmuir film area A over time for a constant film pressure $\prod$ = 18 mN m^{-1}.

UV-Visible Absorption Spectra

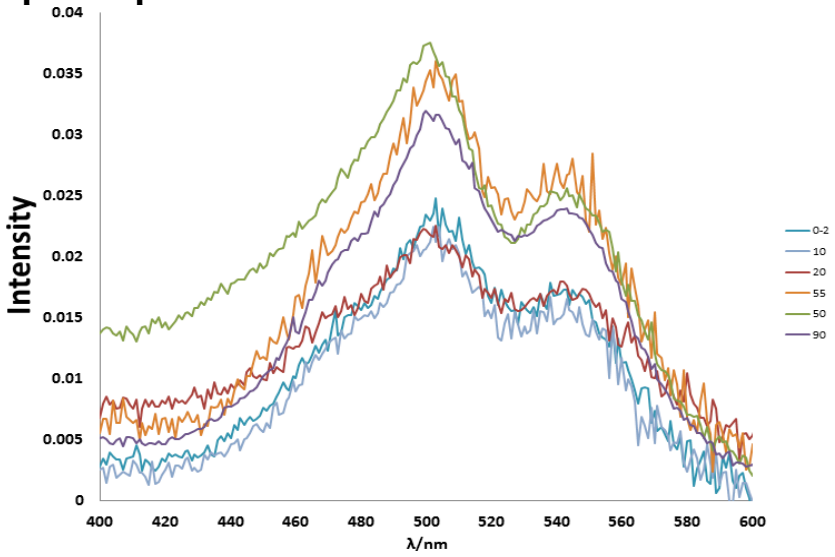

Figure C. Polarized UV-visible spectrum of two LB monolayers of **1** on glass as a function of the rotation angle ω of the analyzer filter relative to the polarizer filter. Other than the bathochromic shift (about 15 nm) from isotropic solution to the monolayer, there was also a change in the relative intensities of the vibronic sub-bands. The transition moment for the peak at 540 nm (if due to π-π interactions normal to the PBI plane) should peak at a different angle ω than the peak at 503 nm. The monolayer of **1** studied using crossed polarizers (ω=0° for parallel, ω=90° for perpendicular or "crossed" polarizers). At ω ≤ 20°, the intensities are low; the intensities are maximum at ω = 50°, and decrease again at ω = 90°. The transition moment vector within the PBI moiety is probably oriented as it is in perylene, i.e. along the long molecular axis of PBI. Therefore the intensity maximum at ω = 50° suggests that the PBI molecular plane is not normal to the glass plane. But this polarization study should be considered incomplete.

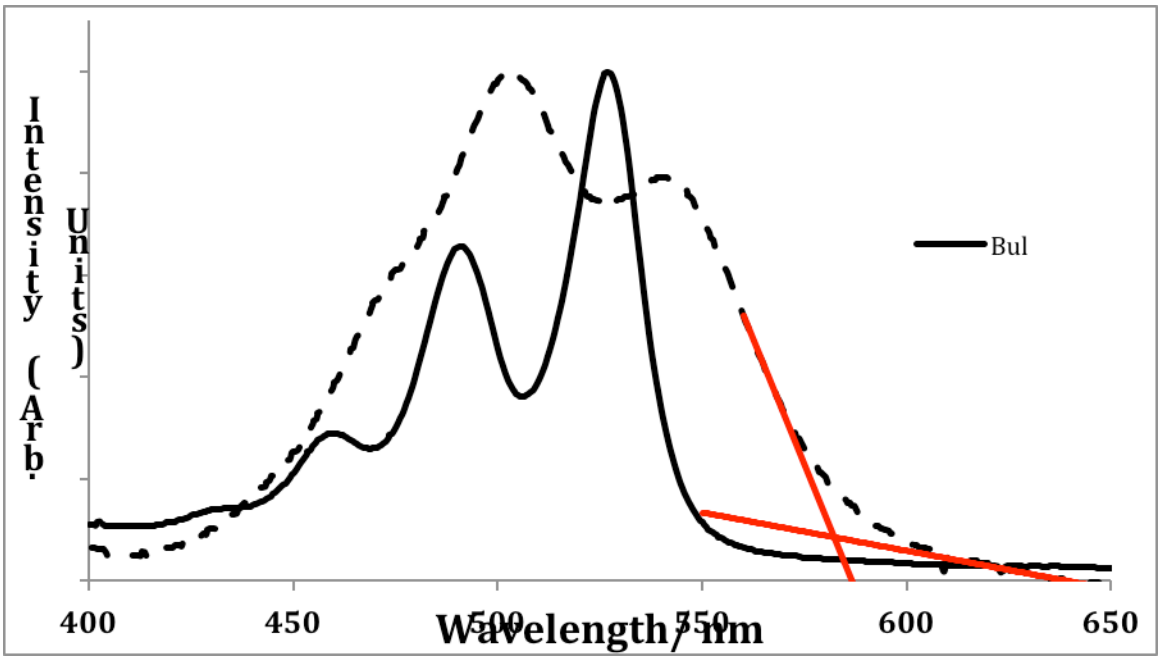

Figure D1. Overlay of the spectra of perylenebisimide [39] and of monolayer of **1.** The two red lines are extrapolations of the absorption maxima; their intersection indicates an estimate of the band edge of **1.**

AFM

The AFM image (**Figure D2**) shows a well-ordered monolayer, but with whitish spots (multilayer) formed at grain boundaries. The data suggested that the monolayer transfers onto the silicon uniformly, with a few grain boundaries; at the boundaries the monolayer folds back onto itself. Two random spots were chosen to estimate the monolayer thickness from defects in the monolayer: the thickness was 3.3 nm.

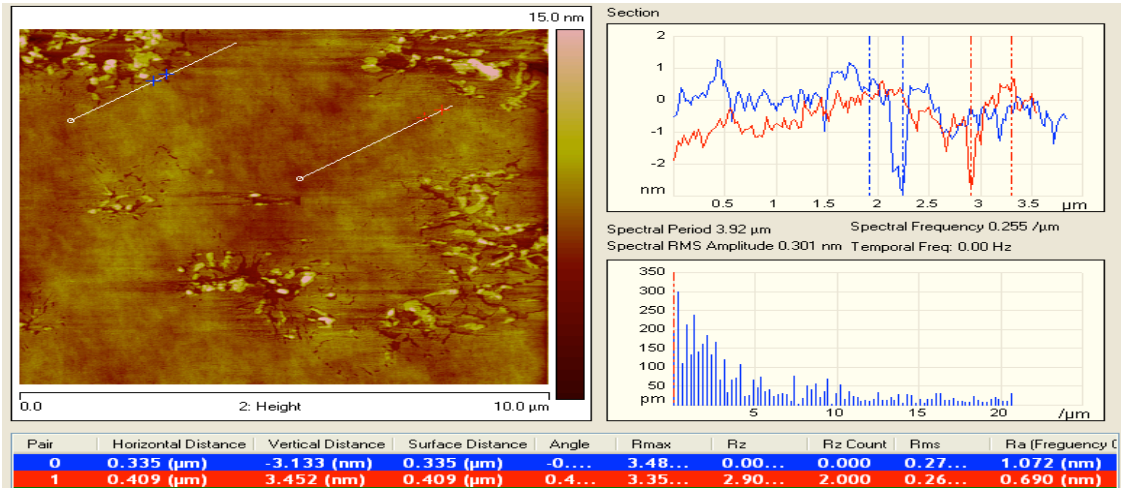

Figure D2. AFM image of a uniform monolayer of **1** with multilayer formation at some of the grain boundaries.

IV measurements

Current-Voltage Asymmetries in the "GaIn | Ga_2O_3 | Au" Junction

An important issue was whether some of the rectification could be ascribed to the asymmetric junction created when Ga_2O_3 forms at the surface of a drop of Ga-In eutectic ("EGaIn") in air, but disappears when Ga-In alloys with Au [10].

As controls, the IV curves for simpler "wire | Au paste | 'bottom Au' electrode | EGaIn | Au wire" sandwiches were investigated. The wire wetted with EGaIn was used directly as the top contact to the bottom Au electrode (no top Au pad and no organic monolayer).

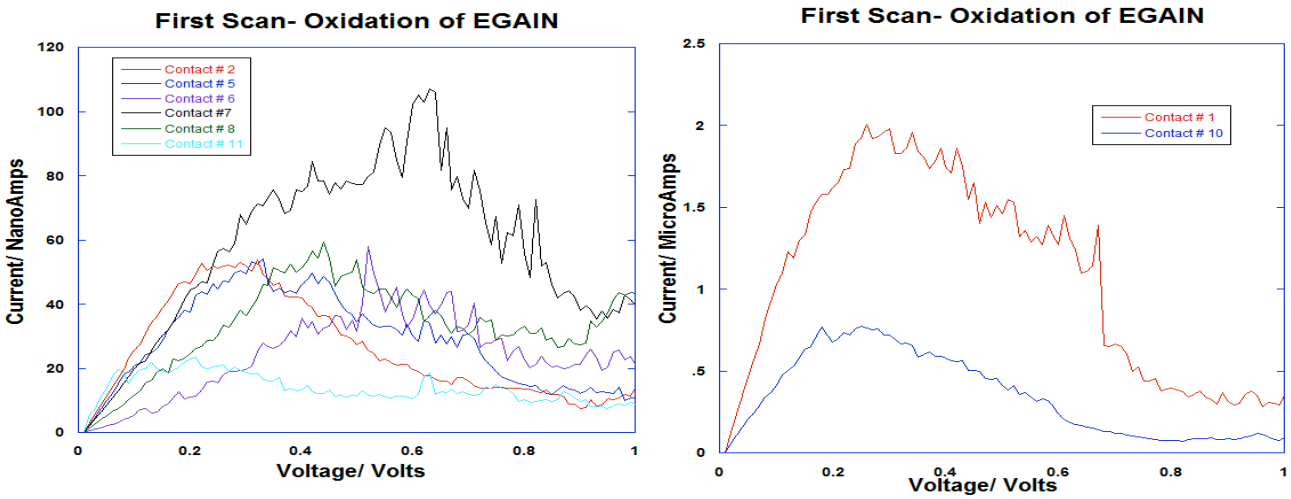

Figure E. IV curves for "wire | Au paste | 'bottom Au' electrode | EGaIn | Au wire"

this should yield the IV characteristics of a "EGaIn | Ga_2O_3 | Au" junction in the absence of an organic monolayer. **Figure E** shows the results of the first scan of 8 (out of 11) junctions that did not short on sweeping the bias from 0 to +1 V.

From these data it seemed that the bulk EGaIn in contact with gold could form a stable junction and then under bias would either oxidize into a Ga oxide layer, or completely wet the gold, forming a short circuit. We believe this to be the formation of additional Ga_2O_3 through bias-induced redox reactions at the surface; Ga_2O_3 is an n-type semiconductor [7] that can act as a Schottky barrier.

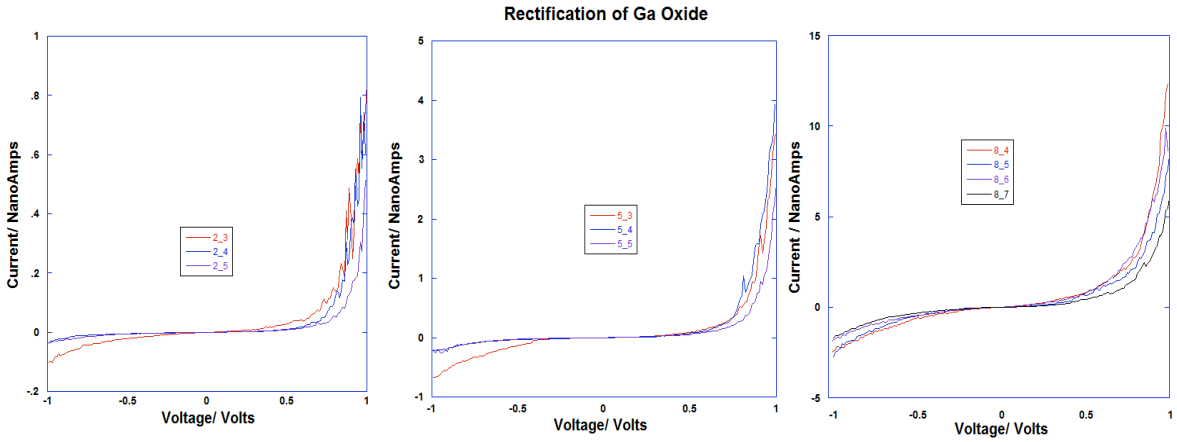

Figure F. IV curves for "wire | Au paste | 'bottom Au' electrode | EGaIn | Au wire" (contacts #2 and #5) with rectification at very low currents (nA).

Repeat scans of contact # 2 and # 5 in **Figure F** show rectification across the "EGaIn | Ga_2O_3 | Au" junction, but it occurs at very low currents (nA): this indicates that this junction was highly resistive. The low-resistance positive-bias was roughly between 0.1 and 1 GΩ. **Figure G** shows that this same type of junction can also be symmetric.

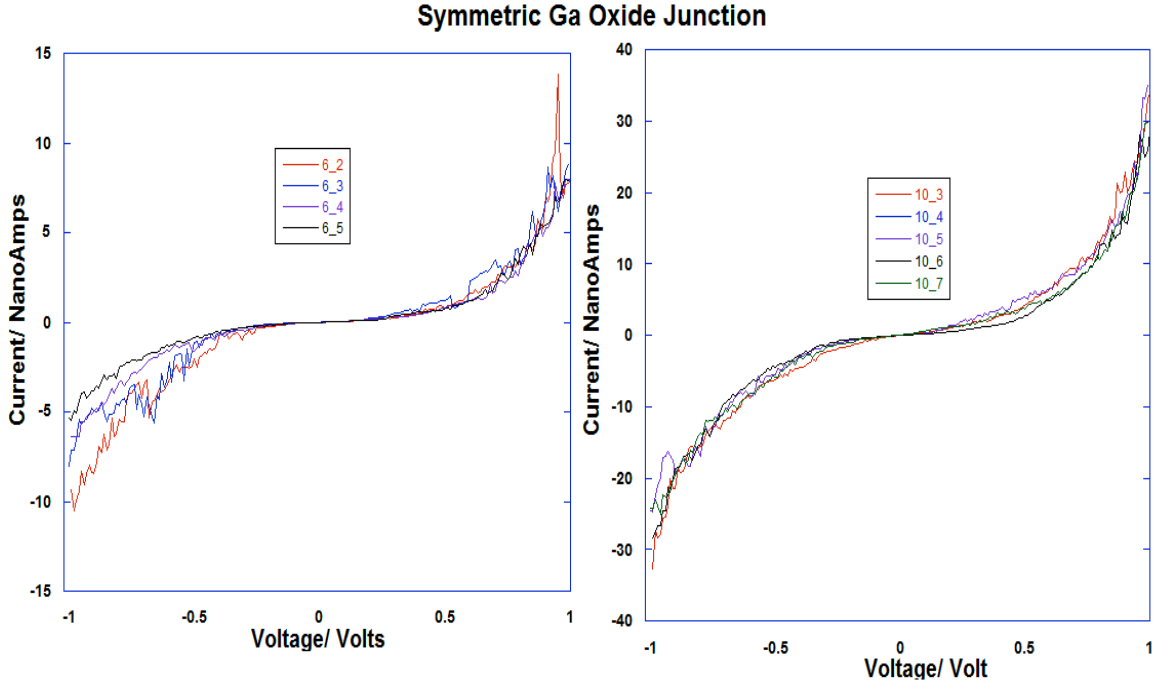

Figure G. Symmetric IV curves for "wire | Au paste | 'bottom Au' electrode | EGaIn | Au wire" at very low currents (nA).

In conclusion, EGaIn can give asymmetric IV curves, but the junction resistances are very high. This reassures us that the rectification reported in the body of this paper is due to molecule 1, and not to artifacts caused by incomplete wetting of the Au pad electrode by the GaIn eutectic.

Table B1. Summary of the most significant results. For each pad scanned between maximum (V_{max}) and minimum ($-V_{max}$) bias voltages, the average rectification ratio <RR> ≡ $-I(V_{mmax})/I(-V_{max})$ is listed. When scans are averaged, the currents at V_{max} and $-V_{max}$ for the relevant first and the last scans, and the resultant RRs are also shown. When RR < 1.0 then the reverse rectification ratio is the inverse of the entries shown **in boldface**. The DC current I (given in μA unless otherwise noted) was measured at 0.1 V intervals, except where indicated. The average forward rectification ratio at 1.5 Volts for the six pads listed here (16 data) is 18.3 ± 22.5 (standard deviation) or 18.3 ± 5.63 (standard error). The average reverse rectification ratio at 2.5 Volts for the six pads listed here (10 data) is 16.0 ± 3.42 (standard error). Details for all pads measured are in **Table B2**.

Pad #	Max. V_m Volts	Scan direc-tion	# of scans	**<RR>**	First scan: I@V_m μA	First scan: I@$-V_m$ μA	RR (first scan)	Last scan: I@V_m μA	Last scan: I@$-V_m$ μA	RR (last scan)
42	1.0	+ to -	7	16.1	2.16	-0.181	11.8	0.535	-0.211	25.4
		- to +	2	10.7	1.53	-0.184	8.32	0.673	-0.0519	13.0
	1.5	+ to -	9	35.9	24.9	-0.170	146.	2.87	-0.227	12.6
		- to +	9	36.4	24.7	-0.134	184.	2.896	-0.305	8.72
	2.0	+ to -	2	**0.79**	64.5	-50.9	1.26	14.2	-46.0	**0.31**
		- to +	2	1.11	67.1	-33.6	1.99	12.9	-53.0	**0.24**
45	1.0	+ to -	3	8.26	1.17	-0.128	9.14	0.365	-0.0447	8.16
		- to +	2	3.96	0.504	-0.130	3.87	0.31	-0.0800	3.96
	1.5	+ to -	3	41.8	5.41	-0.0871	62.11	1.96	-0.0747	26.2
		- to +	2	23.5	2.6	-0.0970	26.80	1.75	-0.0869	20.1
	2.0	+ to -	3	3.20	30.4	-5.77	5.27	9.36	-4.65	2.01
		- to +	3	1.45	13.1	-5.93	2.21	5.70	-6.18	**0.992**
	2.5	+ to -	7	**0.10**	46.	-227	**0.23**	4.33	-95.6	**0.045**
		- to +	7	**0.062**	22.6	-200	**0.113**	2.97	-100	**0.030**
46	1.0	+ to -	3	4.62	0.892	-0.167	5.34	0.115	-0.0281	4.09
		- to +	3	2.47	0.339	-0.160	2.12	0.0905	-0.0215	4.21
	1.5	+ to -	2	89.9	0.739	-0.00759	97.36	0.547	-0.0066	82.5
		- to +	2	32.1‡	0.578	-0.153	3.78‡	0.493	-0.0082	60.3
	2.0	+ to -	2	3.12	6.25	-1.76	3.55	3.61	-1.34	2.69
		- to +	1	2.08	3.25	-1.56	2.08	---	--	---
	2.5	+ to -	3	**0.186**	14.4	-46.7	**0.308**	2.29	-25.6	**0.0894**
		- to +	3	**0.104**	5.86	-40.6	**0.144**	2.71	-25.8	**0.105**
48	1.0	+ to -	2	2.33	0.736	-0.279	2.64	0.361	-0.179	2.02
		- to +	2	1.23	0.339	-0.274	1.24	0.218	-0.172	1.23
	1.5	+ to -	2	18.0	1.50	0.0631	23.8	0.808	-0.0657	12.3
		- to +	3	13.2	1.33	-0.0813	16.4	0.502	-0.0598	8.39
	2.0	+ to -	3	3.65	10.9	-1.67	6.53	2.24	-1.29	1.74
		- to +	2	1.71	3.95	-2.09	1.88	1.91	-1.25	1.71
	2.5	+ to -	5	**0.32**	48.6	-56.1	**0.866**	2.22	-28.3	**0.078**
		- to +	3	**0.16**	14.4	-47.9	**0.300**	1.98	-35.0	**0.056**
52	1.0	+ to -	2	2.68	0.371	-0.112	3.31	0.209	-0.102	2.68
		- to +	2	1.86	0.203	-0.123	1.65	0.230	-0.111	2.07
	2.0	+to -	2	2.82	0.746	-0.245	3.04	0.544	-0.213	2.60
		- to +	2	2.03	0.531	-0.225	2.36	0.479	-2.82	1.70
	2.5	+ to -	20§	**0.174**	3.51	-16.6	**0.211**	1.67	-9.95	**0.147**
		- to +	20§	**0.0346**	1.36	-32.3	**0.042**	1.697	-23.6	**0.029**
	2.0	+ to -	1	**0.219**	0.187	-0.855	---	---	---	---

		- to +	1	**0.0769**	0.154	-2.02	---	---	---	---
	1.5	+ to -	2	1.95	0.0212	-0.0177	1.19	0.0192	-0.00709	2.71
		- to +	3	1.02	0.0178	-0.0198	**0.899**	0.0170	-0.0164	1.03
	1.0	+ to -	5	144.	616 pA	-6.11 pA	100.8	662 pA	-3.63 pA	182.
		- to +	4	93.4	506 pA	-9.52 pA	53.2	577 pA	-4.24 pA	136.
54	1.0	+ to -	2	3.30	**3.15**	-0.921	3.41	2.29	-0.719	3.18
		- to +	2	1.56	1.69	-0.988	1.71	1.15	-0.810	1.56
	1.5	0 to +	5¶	4.36	11.4	-1.63	6.99	7.56	-2.00	3.78
		0 to -	5¶							
	2.0	0 to +	4¶	4.77	74.5	-12.7	5.87	65.2	-17.1	3.25
		0 to -	4¶							
	2.5	0 to +	3¶	**0.488**	518	-841	**0.615**	384	925	**0.415**
		0 to -	3¶							
	2.0	+ to -	1	1.29	131	-101	1.29	---	---	---
		- to +	1	**0.318**	47.1	-158	**0.318**	---	---	---
	1.5	+ to -	2	17.0	15.0	-866	17.32	7.25	-434	16.7
		- to +	2	2.61	4.74	-2.15	2.20	3.80	-1.26	3.02
	1.0	+ to -	2	13.9	0.05	-0.00343	14.6	0.0461	-0.00347	13.3
		- to +	2	6.64	0.0280	-0.00363	7.71	0.0272	0.00489	6.64
	1.5	+ to -	2	25.4	4.59	-0.169	28.8	3.99	-0.166	24.0
		- to +	2	4.56	2.46	-0.534	**0.613**	49.0	-52.6	**0.932**
	2.0	+ to -	2	**0.773**	32.8	-53.5	**0.613**	49.0	-52.6	**0.932**
		- to +	2	**0.289**	29.6	-104	**0.284**	29.3	-99.5	**0.294**
	2.5	+ to -	3	**0.295**	505	-1356	**0.372**	208	1016	**0.205**
		- to +	3	**0.144**	221	-1425	**0.56**	161	-1210	**0.144**
	2.0	+ to -	1	1.08	85.8	-79.2	1.08	---	---	---
		- to +	1	**0.019**	24.2	-1243	**0.019**	---	---	---
	1.5	+ to -	2	8.94	6.48	-0.725	8.94	3.53	-0.395	8.94
		- to +	2	1.59	2.35	-1.55	1.52	1.94	-1.17	1.66
	1.0	+ to -	3	11.0	0.0192	-0.00137	14.0	0.0216	-0.00254	8.50
		- to +	2	4.69	0.0137	-0.00288	4.76	0.0130	-0.00282	4.61

‡ unstable sandwich: there is larger conductivity for “negative scan”.
¶ in 0.05 V steps

Table B2. Detailed IV measurements. Underlines separate data for different pads or for different pre-chosen V_{max}. For each pad (1 through 21) the cycle # is the sequential record of the scan, with the direction used in the scan ("pos"= increasing *V*); "neg" = decreasing *V)*. The current *I* at 0.001 V is also listed. The maximum bias V_{max} and the current *I* at that maximum bias is given next; The rectification ratios *RR(RRR)* at $+V_{max}$ ($-V_{max}$) are in **boldface** for emphasis. *RR* is given as a number (as a fraction) if the enhanced current is at positive (negative) bias.

Pad #	Cycle #	Scan range Volts	V_{max} Volts	I @V_{max} µAmps	I@ -V_{max} µAmps	RR @1V	**RR @V_{max}**	R@V_{max} MOhms
27 ex1	1	-1.5 to 0	0.0	.picoA currents				
28 ex2	2	-1.5 to 0.91	0.91 sh	38.0	-21.3	--	**1.78**	0.0239
29 ex3	2	-1.5 to 0.97	0.97 sh.	27.2	-12.3	--	**2.21**	0.0357
30 ex4	2	-1.5 to 1.15	1.15 sh	27.6	-3.64		**7.58**	0.0363
31 ex5	2	-1.5 to 0.94	0.94 sh	13.4	-5.75		**2.33**	0.0701
32 ex6	2	-1.0 to 0.62	0.62 sh	3.42	-2.14		**1.60**	0.181
33 ex7	2	-1.0 to 0.94	0.94 sh	10.2	4.11		**2.48**	0.0922
34 ex8	3	-1.0 to 1.00	1.00	29.9	-5.22	5.72	**5.72**	0.0331
34 ex8	4	-1.0 to 0.84	0.84 sh	5.66	-3.82		**1.48**	0.148
35 ex10	1	-1.0 to 0.63	0.63 sh	6.40	-6.75		**0.985**	0.0984
36 ex14	2	-1.0 to 0.58	0.58 sh	1.90	-0.994		**1.91**	0.305
37 ex15	2	-1.0 to 0.66	0.66 sh	1.39	1.26		**1.10**	0.475
38	2	0.0 to 0.87	0.87 sh	16.2				0.0537
39	2	0.0 to 0.74	0.74 sh	3.25				0.228
40	1	0.71 to 0.0	0.71	6.72				0.106
40	2	0.71 to 0.0	0.71	5.46				0.130
40	3	0.71 to 0.0	0.71	4.37				0.162
40	4	0.81 to 0.0	0.81	7.10				0.114
40	5	0.81 to 0.0	0.81	6.33	WARM-UP			0.128
40	6	-0.79 to 0.79	0.79	5.77	-1.63		**3.54**	0.137
40	7	-0.79 to 0.79	0.79	3.92	-2.00		**1.96**	0.202
40	8	-0.89 to 0.89	0.89	7.18	-1.43		**5.02**	0.1245
40	9	0.89 to-0.89	0.89	5.95	-1.62		**3.62**	0.150
40	10	-1.00 to 1.00	1.00	14.3	-1.58	9.05	**9.05**	0.070
40	11	-1.00 to 1.00	1.00	15.6	-2.13	7.32	**7.32**	0.0641
41	1	0.71 to 0	0.71	16.7				0.0425
41	2	0.71 to 0	0.71	13.9				0.0511
41	3	0.81 to 0	0.81	15.6				0.0519
41	4	0.81 to 0	0.81	13.9				0.0583
41	5	0.91 to 0	0.91	16.2				0.0562
41	6	0.91 to 0	0.91	14.4	WARM-UP			0.0632
41	7	-1.00 to 1.0	1.00	18.7	-7.63	2.45	**2.45**	0.0535
41	8	1.00 to-1.0	1.00	10.9	-7.74	1.41	**1.41**	0.0917
41	9	-1.20 to 1.2	1.20	20.2	-6.04	2.72	**2.62**	0.0594
41	10	1.20 to -1.2	1.20	14.7	-6.01	1.60	**2.44**	0.0816
41	11	-1.50 to 1.5	1.50	43.3	-6.74	3.02	**6.42**	0.0346
41	12	1.50 to-1.5	1.50	34.3	-7.89	1.40	**4.35**	0.0437
42 ex16	1	0.71 to 0	0.71	1.0				0.710
42	2	0.71 to 0	0.71	0.709				1.001
42	3	0.81 to 0	0.81	0.868				0.933
42	4	0.81 to 0	0.81	0.708				1.144

42	5	0.91 to 0	0.91	1.11	WARM-UP			0.820
42 ex16	6	-1.00 to 1.0	1.00	2.14	-0.185	11.6	**11.6**	0.467
42	7	1.00 to-1.0	1.00	1.67	-0.184	9.08	**9.08**	0.599
42	8	-1.00 to 1.0	1.00	1.76	-0.121	14.6	**14.6**	0.568
42	9	1.00 to-1.0	1.00	1.31	-0.121	10.8	**10.8**	0.763
42	-10	1.00 to 1.0	1.00	1.42	-0.0916	15.5	**15.5**	0.704
42	11	1.00 to-1.0	1.00	0.770	-0.0709	10.9	**10.9**	1.30
42	12	-1.00 to 1.0	1.00	0.811	-0.0654	12.4	**12.4**	1.23
42	13	1.00 to-1.0	1.00	0.834	-0.0682	12.2	**12.2**	1.20
42	14	-1.00 to 1.0	1.00	0.868	-0.0662	13.1	**13.1**	1.15
42	15	1.00 to-1.0	1.00	0.804	-0.0584	13.8	**13.8**	1.25
42	16	-1.00 to 1.0	1.00	0.862	-0.0541	15.9	**15.9**	1.16
42	17	1.00 to-1.0	1.00	0.761	-0.0519	14.7	**14.7**	1.31
42	18	-1.00 to 1.0	1.00	0.811	-0.0430	18.9	**18.9**	1.23
42	19	-1.00 to 1.0	1.00	0.537	-0.0230	23.0	**23.0**	1.86
42	20	1.20 to-1.2	1.20	2.17	-0.0419	11.0	**51.8**	0.553
42	21	-1.20 to 1.2	1.20	2.37	-0.0420	28.2	**56.4**	0.506
42	22	1.50 to-1.5	1.50	26.1	-0.134	13.0	**195**	0.0575
42	23	-1.50 to 1.5	1.50	24.9	-0.188	45.2	**132**	0.0602
42	24	1.50 to-1.5	1.50	13.7	-0.270	14.0	**50.7**	0.109
42	25	-1.50 to 1.5	1.50	14.8	-0.308	8.81	**48.0**	0.101
42	26	1.50 to-1.5	1.50	8.62	-0.344	3.47	**25.1**	0.174
42	27	-1.50 to 1.5	1.50	8.48	-0.311	6.63	**27.3**	0.177
42	28	1.50 to-1.5	1.50	6.50	-0.343	3.16	**19.0**	0.231
42	29	-1.50 to 1.5	1.50	6.47	-0.284	8.03	**22.8**	0.177
42	30	1.50 to-1.5	1.50	5.16	-0.332	3.15	**15.5**	0.294
42	31	-1.50 to 1.5	1.50	5.24	-0.292	6.35	**17.9**	0.286
42	32	1.50 to-1.5	1.50	4.28	-0.322	3.04	**13.3**	0.350
42	33	-1.50 to 1.5	1.50	4.49	-0.338	4.11	**13.3**	0.334
42	34	1.50 to-1.5	1.50	3.69	-0.362	2.37	**10.2**	0.407
42	35	-1.50 to 1.5	1.50	3.80	-0.313	3.76	**12.1**	0.395
42	36	1.50 to-1.5	1.50	3.23	-0.365	1.45	**8.85**	0.464
42	37	-1.50 to 1.5	1.50	3.26	-0.253	5.04	**12.9**	0.460
42	38	1.50 to-1.5	1.50	2.80	-0.305	2.92	**9.18**	0.536
42	39	-1.50 to 1.5	1.50	2.87	-0.241	6.01	**11.9**	0.522
42	40	1.50 to-1.5	1.50	2.56	-0.284	3.61	**9.01**	0.586
42	41	-1.50 to 1.5	1.50	2.53	-0.234	6.68	**10.8**	0.593
42	42	2.00 to-2.0	2.00	70.3	-33.6	2.37	**2.09**	0.0284
42	43	-2.00 to-2.0	2.00	64.5	-54.1	1.21	**1.19**	0.0310
42	44	2.00 to-2.0	2.00	38.0	-56.2	0.943	**0.676=1/1.48**	0.0526
42	45	-2.00 to-2.0	2.00	36.7	-53.2	1.21	**0.690=1/1.45**	0.141
42	46	2.00 to-2.0	2.00	23.4	-55.7	1/1.04	**0.420=1/2.38**	0.085
42	47	-2.00 to-2.0	2.00	23.3	-51.6	1.03	0.451=**1/2.21**	0.0545
42	48	2.00 to-2.0	2.00	16.3	-54.7	1.17	**0.298=1/3.36**	0.123
42	49	-2.00 to-2.0	2.00	14.2	-48.8	0.974	0.291=**1/3.44**	0.0858
42	50	2.00 to-2.0	2.00	13.6	-53.0	1.08	**0.257=1/3.90**	0.147
42	51	-1.50 to 1.5	1.50	2.11	-1.30	1.03	**1.62**	0.711 **OK**
43 B	1	+1.0to0.001	1.00	5.70	WARMUP			
43 C	3	1.0to-1.0	1.00	1.45	-0.465	3.12	3.12	0.690
43G	2	-1.0to+1.0	1.00	4.74	-0.488	9.71	9.71	0.211
43H	4	-1.0to+1.0	1.00	1.40	-0.228	6.16	6.14	0.714
43	20	2.01to 0.001	2.00	6.51	WARM-UP			0.307
43	21	-2.0 to 2.0	2.00	6.25	-1.67	1.11	**3.74**	0.320

43	22	2.0 to -2.0	2.00	2.90	-1.56	6.21	**1.74**	0.690
43	23	-2.01to 2.0	2.00	3.61	-1.07	4.00	**3.37**	0.554
44	1	0.001to1.0	1.00	5.99 WARMUP				0.167
44	2	-1.0 to 1.0	1.00	5.58	-1.74	3.21	3.21	0.179
44	3	0.93 to -1.0	0.93 sh	1.95	-0.937		2.08	0.472
44?	2	-1.00 to 1.0	1.00	4.74	-0.485	9.77	**9.77**	0.209
44?	3	1.00 to-1.0	1.00	1.31	-0.465	2.82	**2.82**	0.756
44?	4	-1.00 to 1.0	1.00	1.40	-0.221	6.33	**6.33**	0.707
44?	5	1.00 to-1.0	1.00	0.83	-0.213	53.90	**3.90**	1.19
45	1	0.21 to0.001	0.21	0.291				
45	2	0.41 to0.001	0.41	0.708				
45	3	0.61 to0.001	0.61	0.988				
45	4	0.81 to0.001	0.81	1.13				
45	5	1.01 to0.001	1.00	1.30 WARM-UP				
45	6	-1.00 to 1.0	1.00	1.17	-0.128	9.14	**9.14**	0.846
45	7	1.00 to-1.0	1.00	0.50	-0.129	43.88	**3.88**	1.96
45	8	-1.00 to 1.0	1.00	0.576	-0.0763	67.47	**7.47**	1.72
45	9	1.0 to-1.0	1.00	0.31	-0.0779	83.98	**3.98**	3.11
45	10	-1.0 to 1.0	1.00	0.365	-0.0447	8.17	**8.17**	2.71
45	12	-1.5 to 1.5	1.50	5.41	-0.0871	10.6	**62.1**	0.275
45	13	1.5 to-1.5	1.50	2.60	-0.0970	5.46	**26.8**	0.573
45	14	-1.5 to 1.5	1.50	2.95	-0.0795	8.11	**37.1**	0.505
45	15	1.5 to-1.5	1.50	1.75	-0.0870	3.05	**20.1**	0.851
45	16	-1.5 to 1.5	1.50	1.96	-0.0748	6.61	**26.2**	0.760
45	17	+2.0 to 0.0	2.00	29.3	0.0095			0.0683
45	18	-2.0 to 2.0	2.00	30.4	-5.77	2.94	**5.27**	0.0655
45	19	2.0 to-2.0	2.00	13.1	-5.93	2.02	**2.21**	0.152
45	20	-2.0 to 2.0	2.00	14.5	-6.25	3.71	**2.32**	0.137
45	21	2.0 to-2.0	2.00	86.4	-70.2	7.43	**1.23**	0.230
45	22	-2.0 to 2.0	2.00	9.36	-4.66	3.93	**2.01**	0.212
45	23	2.0 to-2.0	2.00	5.70	-6.16	4.87	0.926=**1/1.08**	0.349
45	26	+2.5to-2.5	2.50	40.1	-424.	12.0	**0.0946=1/10.6**	0.0623
45	27	-2.5 to 2.5	2.50	46.0	-227.	1/1.27	0.203=**1/4.93**	0.0541
45	28	2.5 to-2.5	2.50	22.6	-200.	14.9	0.113=**1/8.85**	0.110
45	29	-2.5 to 2.5	2.50	30	-201.	1/1.11	0.149=**1/6.71**	0.0819
45	30	2.5 to-2.5	2.50	13.4	-196.	12.6	0.0685=**1/14.6**	0.184
45	31	-2.5 to 2.5	2.50	15.6	-168.	1.29	0.0925=**1/10.8**	0.160
45	32	2.5 to-2.5	2.50	13.9	-165.	11.3	0.0840=**1/11.9**	0.179
45	33	-2.5 to 2.5	2.50	14.1	-149.	1.97	0.0943=**1/10.6**	0.177
45	34	2.5 to-2.5	2.50	9.69	-150.	14.2	0.0645=**1/15.5**	0.257
45	35	-2.5 to 2.5	2.50	10.1	-138.	1.08	0.0730=**1/13.7**	0.247
45	36	2.50 to-2.5	2.50	5.75	-144.	1.75	0.040 = **1/25.0**	0.433
45	37	-2.50 to 2.5	2.50	5.1	-106.	1.76	0.0483=**1/20.7**	0.485
45	38	2.50 to-2.5	2.50	3.87	-110.	1/2.06	0.0352=**1/28.4**	0.643
45	39	-2.50 to 2.5	2.50	4.33	-95.7	3.49	0.0452=**1/22.1**	0.575
45	40	2.50 to-2.5	2.50	2.97	-100.	14.5	0.0297=**1/33.7**	0.838
46	1	0.21 to 0.01	0.20	0.0973				2.055
46	2	0.41 to 0.01	0.40	0.247				1.62
46	3	0.61 to 0.01	0.60	0.320				1.88
46	4	0.81 to 0.01	0.80	0.327				2.45
46	5	1.00 to 0.01	1.00	1.13 WARM-up Ramping				0.85
46	6	-1.00 to 1.0	1.00	0.892	-0.167	5.34	**5.34**	1.11
46	7	1.00 to-1.0	1.00	0.339	-0.160	2.12	**2.12**	2.92

46	8	-1.00 to 1.0	1.00	0.337	-0.076	4.43	**4.43**	2.94
46	9	1.00 to-1.0	1.00	0.122	-0.112	1.09	**1.09**	8.11
46	10	-1.00 to 1.0	1.00	0.155	-0.0217	7.14	**7.14**	6.39
46	11	1.00 to-1.0	1.00	0.0905	-0.0215	4.21	**4.21**	10.9
46	14	1.50 to-1.5	1.50	0.0970	-0.00278	6.99	**34.9**	1.54
46	15	-1.50 to 1.5	1.50	0.997	-0.125	10.0	**7.98**	1.49
46	16	1.50 to-1.5	1.50	0.578	-0.153	3.47	**3.78**	2.58
46	17	-1.50 to 1.5	1.50	0.739	-0.00759	31.3	**97.4**	2.02
46	18	1.50 to-1.5	1.50	0.493	-0.00818	15.2	**60.3**	3.02
46	19	-1.50 to 1.5	1.50	0.547	-0.00663	39.1	**82.5**	2.72
46	21	-2.00 to 2.0	2.00	6.25	-1.61	1.11	**3.88**	0.318
46	22	2.00 to-2.0	2.00	2.81	-1.56	6.21	**1.80**	0.708
46	23	-2.00 to 2.0	2.00	3.61	-0.994	4.08	**3.63**	0.551
46	25	-2.50 to 2.5	2.50	14.4	-46.7	1/2.77	0.309=**1/3.24**	0.173
46	26	2.50 to-2.5	2.50	5.86	-40.6	22.37	0.144=**1/6.93**	0.425
46	27	-2.50 to 2.5	2.50	7.42	-45.7	1/1.64	0.162=**1/6.16**	0.336
46	28	2.50 to-2.5	2.50	2.52	-39.3	11.9	0.0641=**1/15.6**	0.988
46	29	-2.50 to 2.5	2.50	2.29	-25.6	5.79	0.0893=**1/11.2**	0.956
46	30	2.50 to-2.5	2.50	2.71	-25.8	383	0.105=**1/9.52**	0.919
47	1	0.01to 0.11	0.110	5.71				
47	2	0.001to0.19	0.190	47.0 WARM-UP				
48	1	0.001to0.211	0.211	0.138				1.53
48	2	0.001to0.411	0.411	0.284				1.44
48	3	0.001to0.611	0.611	0.487				1.25
48	4	0.001to0.811	0.811	0.650				1.25
48	5	0.001to1.01	1.00	0.789 WARM-UP ramping				1.27
48	6	-1.00 to 1.0	1.00	0.736	-0.279	2.64	**2.64**	1.36
48	7	1.00 to-1.0	1.00	0.359	-0.274	1.31	**1.31**	3.64
48	8	-1.00 to 1.0	1.00	0.361	-0.180	2.01	**2.01**	2.79
48	11	1.50 to-1.5	1.50	4.92	-0.0883	1.86	**55.7**	16.8
48	12	1.50 to-1.5	1.50	1.42	-0.0811	3.12	**17.5**	1.00
48	13	-1.50 to 1.5	1.50	1.50	-0.0628	3.74	**23.9**	0.99
48	14	1.50 to-1.5	1.50	8.21	-0.510	3.21	**16.1**	29.1
48	15	-1.50 to 1.5	1.50	0.809	-0.0680	2.81	**11.9**	23.0
48	16	1.50 to-1.5	1.50	0.538	-0.0598	1.66	**9.00**	2.63
48	18	2.00 to-2.0	2.00	10.8	-0.297	2.20	**36.4**	0.178
48	19	-2.00 to 2.0	2.00	1.77	-0.274	1/1.75	**6.46**	1.06
48	20	2.00 to-2.0	2.00	4.61	-2.33	2.56	**1.98**	0.436
48	21	-2.00 to 2.0	2.00	4.34	-1.61	1/2.39	**2.70**	1.10
48	22	2.00 to-2.0	2.00	2.07	-1.25	1/23.8	**1.66**	0.918
48	23	-2.00 to 2.0	2.00	2.24	-1.36	1/2.27	**1.65**	0.888
48	25	2.50 to-2.5	2.50	53.4	-18.7	1/1.04	**2.86**	0.0470
48	26	-2.50 to 2.5	2.50	48.6	-55.9	1/2.69	0.870=**1/1.15**	0.0429
48	28	2.50 to-2.5	2.50	15.1	-49.8	1/1.34	0.301=**1/3.32**	0.165
48	29	-2.50 to 2.5	2.50	49.4	-144.0	1/5.26	0.342=**1/2.92**	0.147
48	30	2.50 to-2.5	2.50	6.09	-53.0	1/1.43	0.115=**1/8.70**	0.412
48	31	-2.50 to 2.5	2.50	6.02	-37.3	1/3.85	0.161=**1/6.20**	0.414
48	32	-2.50 to 2.5	2.50	4.85	-36.2	1/5.75	0.134=**1/7.46**	0.513
48	33	2.50 to-2.5	2.50	1.98	-35.0	1/2.01	0.0565=**1/17.7**	1.14
48	34	-2.50 to 2.5	2.50	2.22	-28.4	1/5.59	0.0781=**1/12.8**	1.12
48	36	-3.00 to 3.0	3.00	37.1	-145.0	1/1.56	0.255=**1/3.91**	0.80
48	37	3.00 to-3.0	3.00	9.43	-119.0	1/5.65	0.0794=**1/12.6**	0.304
48	38	-3.00 to 3.0	3.00	9.93	-135.0	1/1.89	0.0735=**1/13.6**	0.301

49	1	0.001to0.21	0.21	0.741				0.283
49	2	0.001to0.41	0.41	3.09				0.133
49	3	0.001to0.61	0.61	8.65				0.0705
49	4	0.001to0.81	0.81	16.1	WARMUP			0.0503
49	5	-1.0to+1.0	1.00	32.5	-5.29	6.14	**6.14**	0.0308
49	6	+1.0to-1.0	1.00	17.2	-5.38	3.20	**3.20**	0.0581
49	7	-1.0to+1.0	1.00	18.6	-6.16	3.02	**3.02**	0.0538
49	8	-1.0 to0.84	0.84 sh	7.43	-6.17			0.113
50	1	0.001to0.21	0.21	0.838				0.251
50	2	0.001to0.41	0.41	2.65				0.157
50	3	0.001to0.61	0.61	5.36				0.114
50	4	0.001to0.81	0.81	8.17				0.0991
50	5	0.001to1.00	1.00	10.1	WARM-UP ramp			0.0990
50	6	-1.0 to+1.0	1.00	10.2	-3.26	3.13	**3.13**	0.0980
50	7	+1.0 to-1.0	1.00	6.70	-3.27	2.05	**2.05**	0.149
50	8	-1.0 to+1.0	1.00	6.96	-2.39	2.91	2.91	0.144
50	9	+1.0to-1.0	1.00	5.31	-2.42	2.19	**2.19**	0.188
50	10	1.47 to 0.001	1.47sh	46.0				0.0320
51	1	0.001to0.21	0.21	0.180				1.17
51	2	0.001to0.41	0.41	0.474				0.867
51	3	0.001to0.61	0.61	1.16				0.525
51	4	0.001to0.81	0.81	1.67				0.485
51	5	0.001to 1.0	1.00	2.24				0.446
51	6	-1.00to+1.0	1.00	2.35	-0.697	3.37	**3.37**	0.425
51	7	1.00 to-1.0	1.00	1.35	-0.705	1.91	**1.91**	0.741
51	8	-1.00 to+1.0	1.00	1.36	-0.421	3.23	**3.23**	0.735
51	9	1.00 to-1.0	0.98 sh	1.19	-0.409		**2.91**	0.824
52	1	0.001to0.21	0.21	0.312				0.673
52	2	0.001to0.41	0.41	0.568				
52	3	0.001to0.61	0.61	0.641				
52	4	0.001t0.002	0.81	0.530				
52	5	0.001to1.00	1.00	0.366	WARMUP ramp			
52	6	-1.0 to1.0	1.00	0.371	-0.112	3.31	**3.31**	2.70
52	7	+1.0 to-1.0	1.00	0.203	-0.123	1.65	**1.65**	4.93
52	8	-1.0 to 1.0	1.00	0.209	-0.102	2.05	**2.05**	4.78
52	9	+1.0 to-1.0	1.00	0.230	-0.111	2.07	**2.07**	4.35
52	10	+1.5 to 0.00	1.50	0.394				3.81
52	11	+1.5 to-1.5	1.50	0.199 -	0.155	1.28	**1.28**	7.54
52	12	+2.0 to -2.0	2.00	0.531	-0.225	0.714	**2.36**	3.77
52	13	-2.0 to+2.0	2.00	0.745	-0.505	2.29	**1.48**	2.68
52	14	+2.0 to-2.0	2.00	0.479	-0.282	0.955	**1.70**	4.18
52	15	-2.0 to+2.0	2.00	0.544	-0.213	0.352	**2.13**	3.68
52	16	+2.5to+0.001	2.50	4.66				5.36
52	17	-2.5 to+2.5	2.50	4.91	-19.5	133.	**0.252=1/3.97**	5.09
52	18	+2.5to-2.5	2.50	2.06	-25.5	29.2	**0.0808=1/12.4**	1.21
52	19	-2.5 to+2.5	2.50	3.16	-19.4	82.4	**0.163=1/6.14**	0.791
52	20	+2.5 to-2.5	2.50	1.99	-27.6	21.8	**0.0721=1/13.9**	1.26
52	21	+2.5 to-2.5	2.50	1.75	-26.1	2.96	**0.0670=14.9**	1.429
52	22	+2.5 to-2.5	2.50	1.16	-29.7	2.90	**0.0390=1/25.6**	2.16
52	23	-2.5 to+2.5	2.50	2.39	-13.0	33.2	**0.184=1/5.44**	1.05
52	24	+2.5 to-2.5	2.50	1.03	-28.2	2.29	**0.0366=1/27.4**	2.43
52	25	-2.5 to+2.5	2.50	2.61	-13.2	33.6	**0.198=1/5.06**	0.958
52	26	+2.5 to-2.5	2.50	0.993	-27.7	4.83	**0.0358=1/27.9**	2.52

52	27	-2.5 to+2.5	2.50	2.19	-12.8	40.2	**0.171=1/5.84**	1.14
52	28	+2.5 to-2.5	2.50	0.936	-26.1	5.63	**0.0359=1/27.9**	2.67
52	29	-2.5 to+2.5	2.50	2.20	-12.5	11.3	**0.176=1/5.68**	1.14
52	30	+2.5 to-2.5	2.50	0.923	-26.7	3.56	0.0346=1/28.9	2.71
52	31	-2.5 to+2.5	2.50	2.01	-12.2	6.99	**0.165=1/6.07**	1.24
52	32	+2.5 to-2.5	2.50	0.853	-26.9	4.25	0.0317=1/31.5	2.93
52	33	-2.5 to+2.5	2.50	1.82	-10.8	11.32	**0.169=1/5.93**	1.37
52	34	+2.5 to-2.5	2.50	0.842	-24.6	7.29	**0.0342=1/29.2**	2.97
52	35	-2.5 to+2.5	2.50	1.76	-10.5	105.	**0.168=1/5.97**	1.56
52	36	+2.5 to-2.5	2.50	0.803	-23.8	7.37	**0.0337=1/29.6**	3.11
52	37	-2.5 to+2.5	2.50	1.77	-10.9	131.	**0.162=1/6.16**	1.41
52	38	+2.5 to-2.5	2.50	0.834	-23.7	13.2	**0.0352=1/28.4**	3.00
52	39	-2.5 to+2.5	2.50	1.55	-10.6	88.9	**0.146=1/6.84**	1.61
52	40	+2.5 to-2.5	2.50	0.808	-23.5	9.49	**0.0344=1/29.1**	3.09
52	41	-2.5 to+2.5	2.50	1.61	-10.8	76.7	**0.149=1/6.71**	1.55
52	42	+2.5 to-2.5	2.50	0.759	-25.2	12.7	**0.0301=1/33.2**	3.29
52	43	-2.5 to+2.5	2.50	1.60	-10.4	123.	**0.154=1/6.5**	1.56
52	44	+2.5 to-2.5	2.50	0.746	-24.4	9.77	**0.0305=1/32.7**	3.35
52	45	-2.5 to+2.5	2.50	1.52	-11.1	100.	**0.137=1/7.30**	1.64
52	46	+2.5 to-2.5	2.50	0.734	-23.2	9.90	**0.0316=1/31.6**	3.41
52	47	-2.5 to+2.5	2.50	1.45	-10.4	69.0	**0.139=1/7.17**	1.72
52	48	+2.5 to-2.5	2.50	0.726	-23.6	10.4	**0.0308=1/32.5**	3.44
52	49	-2.5 to+2.5	2.50	1.40	-10.4	94.7	**0.135=1/7.43**	1.79
52	50	+2.5 to-2.5	2.50	0.728	-23.3	3.11	**0.0312=1/32.0**	3.43
52	51	-2.5 to+2.5	2.50	1.47	-9.95	19.8	**0.148=1/6.77**	1.70
52	52	+2.5 to-2.5	2.50	0.697	-23.6	7.69	**0.0295=1/33.9**	3.59
52	53	-2.5 to+2.5	2.50	3.71	-15.2	39.2	**0.244=1/4.10**	0.674
52	54	+2.5 to-2.5	2.50	1.36	-32.3	7.56	**0.0421=1/23.8**	1.84
52	55	-2.5 to+2.5	2.50	3.51	-16.6	108.8	**0.211=1/4.73**	0.712
52	56	+2.5 to-2.5	2.50	1.29	-32.1	1.55	**0.0402=1/24.9**	2.08
52	57	-2.5 to+2.5	2.50	2.96	-15.0	108.7	**0.197=1/5.07**	0.845
52	58	+2.5 to-2.5	2.50	1.18	-28.9	11.8	**0.0408=1/24.5**	1.39
52	59	-2.5 to+2.5	2.50	2.84	-13.4	145.4	**0.212=1/4.72**	0.880
52	60	+2.5 to-2.5	2.50	1.10	-28.6	1.87	**0.0385=1/26.0**	2.27
52	61	-2.5 to+2.5	2.50	2.61	-13.2	41.1	**0.198=1/5.06**	0.958
52	62	+2.0to-2.0	2.00	0.154	-2.02	27.8	**0.0762=1/13.1**	13.0
52	63	-2.0to+2.0	2.00	0.180	-0.855	82.0	**0.211=1/4.75**	11.1
52	64	+1.5to-1.5	1.50	0.0178	-0.0198	41.5	**0.900=1/1.11**	84.3
52	65	-1.5to+1.5	1.50	0.0212	-0.0177	34.6	**1.20**	70.7
52	66	+1.5to-1.5	1.50	0.0176	-0.0154	46.1	**1.14**	852
52	67	-1.5to+1.5	1.50	0.0192	-0.00709	146.2	**2.71**	26.0
52	68	+1.5to-1.5	1.50	0.0170	-0.0164	43.0	**1.04**	70.6
52	69	-1.2to+1.2	1.20	0.00277	-0.0000631	113.0	**43.9**	433.0
52	70	+1.2to-1.2	1.20	0.00267	-0.000105	90.2	**25.4**	449.
52	71	-1.0to+1.0	1.00	0.000616	-0.00000611	101.0	**101.0**	1620.
52	72	+1.0to-1.0	1.00	0.000541	-0.00000755	71.7	**71.7**	1850.
52	73	-1.0to+1.0	1.00	0.000646	-0.00000441	146.	**146.**	1550.
52	74	+1.0to-1.0	1.00	0.000588	-0.00000522	113.	**113.**	1700.
52	75	-1.0to+1.0	1.00	0.000674	-0.00000462	146.	**146**.	1480.
52	76	+1.0to-1.0	1.00	0.000577	-0.00000424	136.	**136**.	1733.
52	77	-1.0to+1.0	1.00	0.000689	-0.00000481	143.	**143**.	1450.
52	78	+1.0to-1.0	1.00	0.000506	-0.00000952	53.2	**53.2**	1980
52	79	-1.0to+1.0	1.00	0.000662	-0.00000363	182.	182.	1510.

53	1	0.001to0.21	0.21	0.402				0.522
53	2	0.001to0.41	0.41	0.984				0.417
53	3	0.001to0.61	0.61	1.45				0.421
53	4	0.001to0.81	0.81	1.46				0.555
53	5	+1.0to 0.00	1.00	1.40				0.714
53	6	+1.0to 0.00	1.00	1.04				0.962
53	7	-1.0to 0.00	1.00		-0.824			
53	8	+1.0to 0.00	1.00	0.951				1.05
53	9	-1.0to 0.00	1.00		-0.635 WARM-UP			
53	10	+1.0to-1.0	1.00	0.637	-0.712	0.895	**0.895=1/1.11**	1.57
53	11	-1.0 to+1.0	1.00	0.927	-0.494	1.88	1.88	1.09
53	12	+1.45to 0.0	1.45	4.07				
54	1	0.001to0.21	0.21	0.616				3.41
54	2	0.001to0.61	0.61	2.43				0.251
54	3	0.001to0.81	0.81	2.88				0.281
54	4	+1.0to0.002	1.00	3.36 WARM-UP				0.298
54	5	-1.0to+1.0	1.00	3.16	-0.960	3.29	**3.29**	0.316
54	6	+1.0to-1.0	1.00	1.79	-1.03	1.74	**1.74**	0.568
54	7	-1.0to+1.0	1.00	2.29	-0.719	3.18	**3.18**	0.437
54	8	+1.0to-1.0	1.00	1.15	-0.810	1.42	**1.42**	0.870
54	9	+1.0to 0.0	1.00	1.01				0.990
54	10	-1.0to 0.0	1.00	---	-0.449			
54	11	+1.5to 0.0	1.50	11.4				0.132
54	12	-1.5to 0.0	1.50		-1.63			
54	13	+1.5to 0.0	1.50	8.64				0.173
54	14	-1.5to 0.0	1.50		-1.63			
54	15	+1.5to 0.0	1.50	8.47				0.177
54	16	-1.5to 0.0	1.50		-1.53			
54	17	+1.5to 0.0	1.50	7.57				0.198
54	18	-1.5to 0.0	1.50		-1.59			
54	19	+1.5to-0.0	1.50	7.56				0.198
54	20	-1.5to 0.0	1.50		-2.00			
54	21	+2.0to 0.0	2.00	7.45				0.268
54	22	-2.0to 0.0	2.00		-12.7			
54	23	+2.0to 0.0	2.00	7.67				0.261
54	24	-2.0to 0.0	2.00		-13.4			
54	25	+2.0to 0.0	2.00	6.85				0.292
54	26	-2.0to 0.0	2.00		-16.5			
54	27	+2.0to 0.0	2.00	6.42				0.323
54	28	-2.0to 0.0	2.00		-17.1			
54	29	+2.5to 0.0	2.50	51.8				0.0483
54	30	-2.5to 0.0	2.50		-84.1			
54	31	+2.5to 0.0	2.50	41.5				0.0602
54	32	-2.5to 0.0	2.50		-92.4			
54	33	+2.5to 0.0	2.50	38.4				0.0651
54	34	-2.5to 0.0	2.50		-92.5			
54	35	+2.5to-2.5	2.50	31.7	-97.6		**0.324=1/3.08**	0.0789
54	36	-2.5to+2.5	2.50	51.1	-107.		**0.478=1/2.09**	0.0489
54	37	+2.5to 0.0	2.50	28.6	-116.		**0.247=1/4.06**	0.0874
54	38	-2.0to+2.0	2.00	131.	-101.		**1.30**	0.0153
54	39	+2.0to-2.0	2.00	47.1	-148.		**0.318=1/3.14**	0.0425
54	40	-1.5to+1.5	1.50	15.0	-0.866		**17.3**	0.100
54	41	+1.5to-1.5	1.50	4.74	-2.15		**2.20**	0.316

54	42	-1.5to+1.5	1.50	7.25	-0.434		**16.7**	0.207
54	43	+1.5to-1.5	1.50	3.80	-1.26		**3.02**	0.395
54	44	-1.0to+1.00	1.00	0.500	-0.0314	15.9	**15.9**	2.00
54	45	+1.0to	1.00	0.280	-0.0363	7.71	**7.71**	3.57
54	46	-1.0to+1.0	1.00	0.461	-0.0347	13.3	**13.3**	2.17
54	47	+1.0to-1.0	1.00	0.272	-0.0489	5.56	**5.56**	3.68
54	48	-1.5to+1.45	1.50	4.53	-0.268		**16.9**	0.331
54	49	+1.5to-1.45	1.50	3.13	-0.534		**5.86**	0.479
54	50	-1.5to+1.5	1.50	4.90	-0.260		**18.8**	0.306
54	51	+1.5to-1.5	1.50	3.06	-0.842		**3.63**	0.490
54	52	-2.0to+2.0	2.00	32.8	-53.5		**0.613=1/1.63**	0.0610
55	53	+2.0to-2.0	2.00	29.6	-104.		**0.285=1/3.51**	0.0676
54	54	-2.0to+2.0	2.00	49.0	-52.6		**0.283=1/3.53**	0.0408
54	55	+2.0to-2.0	2.00	29.3	-99.5		**0.294=1/3.40**	0.0171
54	56	-2.5to+2.5	2.50	505.	-1360.		**0.371=1/2.69**	0.00495
54	57	+2.5to-2.5	2.50	222.	-1420.		**0.156=1/6.40**	0.0113
54	58	-2.5to+2.5	2.50	351.	-1140.		**0.308=1/3.25**	0.00712
54	59	+2.5to-2.5	2.50	192.	-1340.		**0.143=1/6.98**	0.0130
54	60	-2.5to+2.5	2.50	208.	-1020.		**0.204=1/4.90**	0.0120
54	61	+2.5to-2.5	2.50	161.	-1210.		**0.133=1/7.52**	0.0155
54	62	-2.0to+2.0	2.00	85.8	-79.2		**1.08**	0.0233
54	63	+2.0to-2.0-	2.00	24.2	-124.0		**0.195=1/5.12**	0.0826
54	64	-1.5to+1.5	1.50	6.48	-0.725		**8.94**	0.231
54	65	+1.5to-1.5	1.50	2.35	-1.55		**1.52**	0.638
54	66	-1.5to+1.5	1.50	3.56	-0.395		**9.01**	0.421
54	67	+1.5to-1.5	1.50	1.94	-1.55		**1.25**	0.773
54	68	-1.0to+1.0	1.00	0.192	-0.0137	14.0	**14.0**	5.21
54	69	+1.0to-1.0	1.00	0.137	-0.0288	4.76	**4.76**	7.30
54	70	-1.0to+1.0	1.00	0.230	-0.0219	10.5	**10.5**	4.35
54	71	+1.0to-1.0	1.00	0.130	-0.0282	4.61	**4.61**	7.69
54	72	-1.0to+1.0	1.00	0.216	-0.0254	8.50	**8.50**	4.63

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Pad 42 (1.0 Volt) runs (6-19)

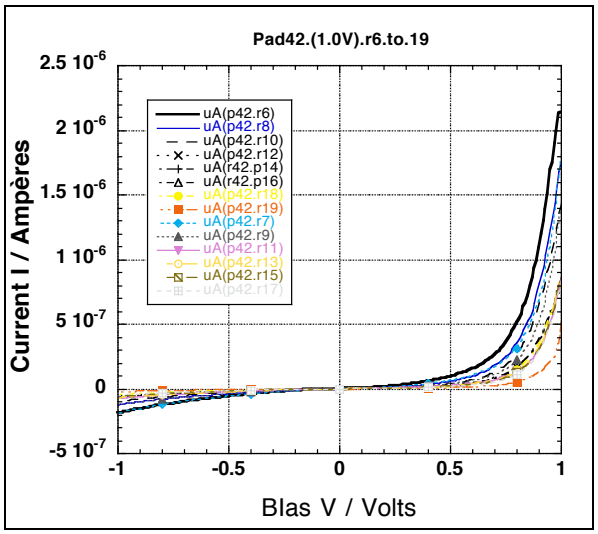

Figure H.

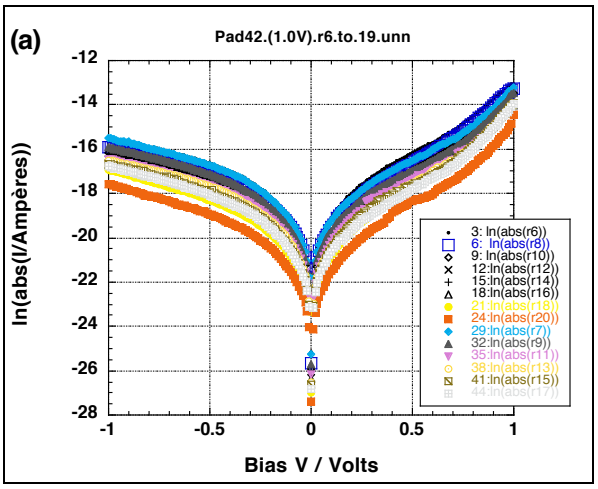

Figure I.

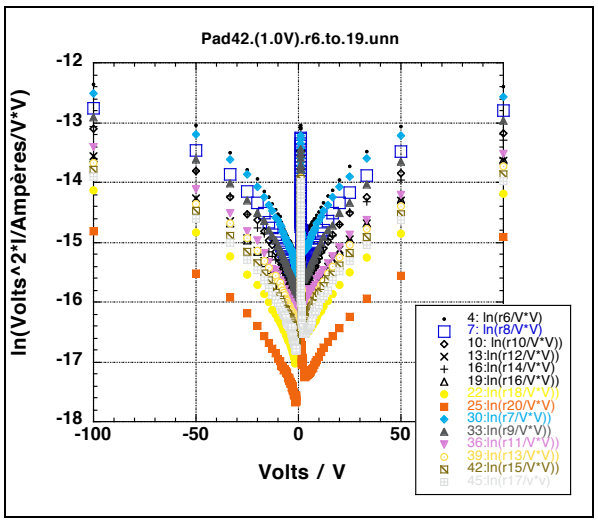

Figure J

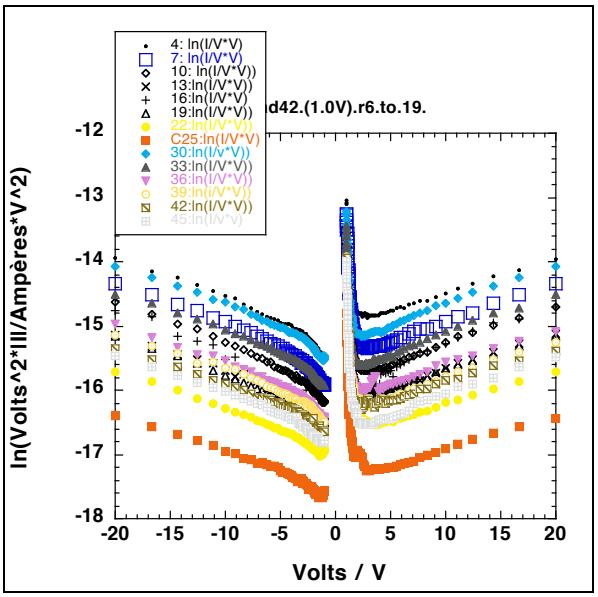

Figure K.

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Pad 42 (1.5 Volts) runs (23-41)

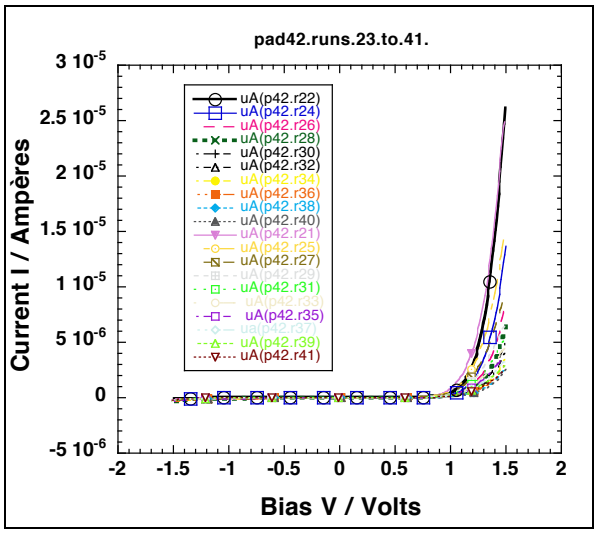

Figure L.

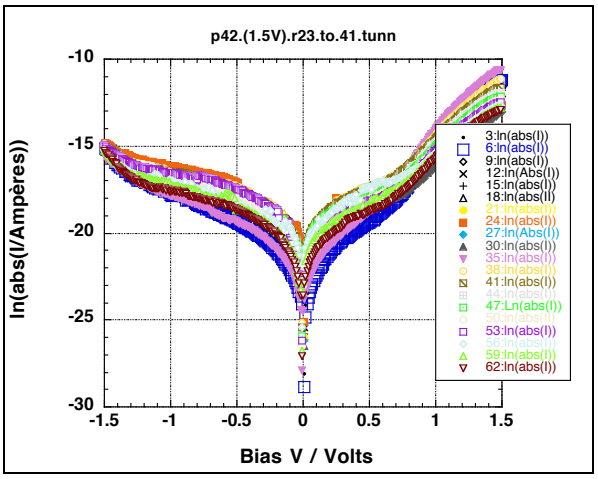

Figure M.

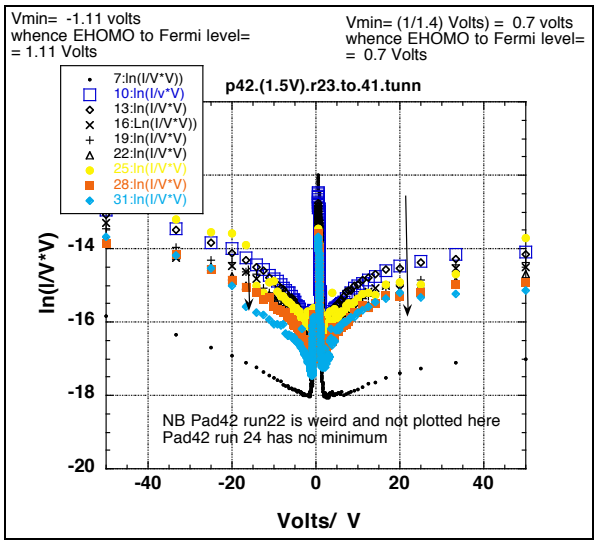

Figure N.

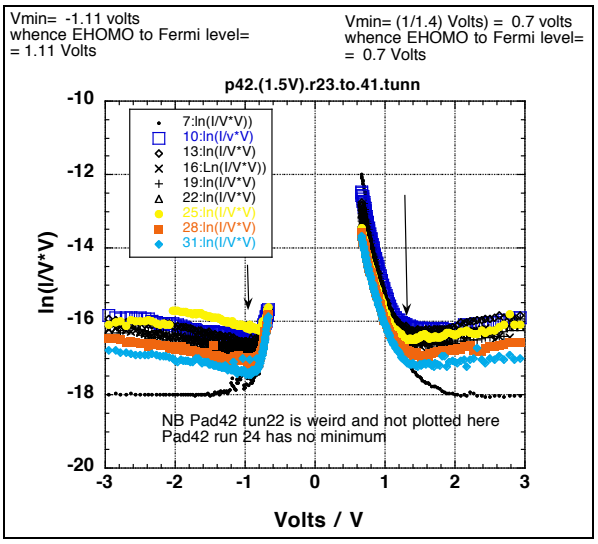

Figure O.

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Pad 42 (2.0 Volts) runs (42-50)

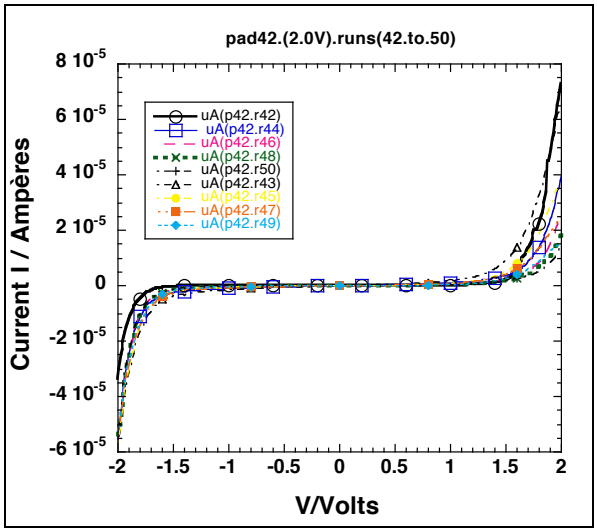

Fig. P.

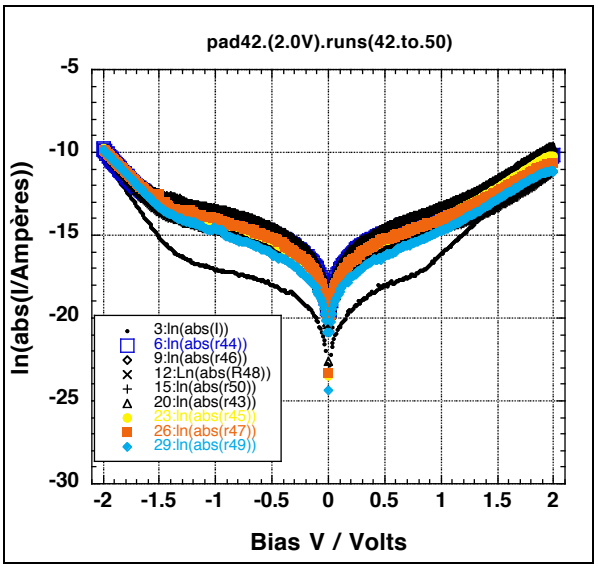

Fig. R.

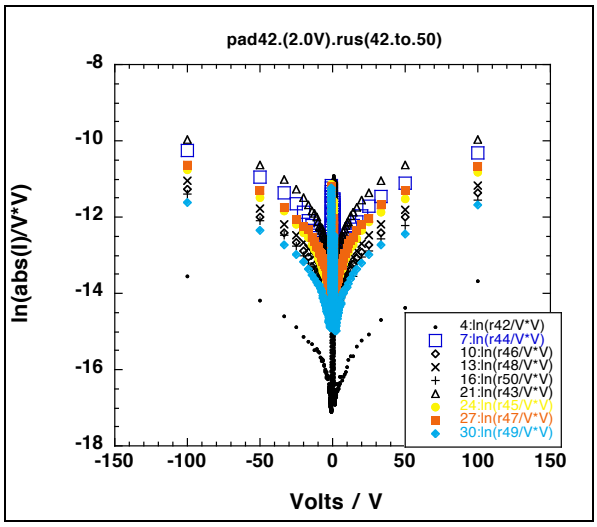

Fig. S.

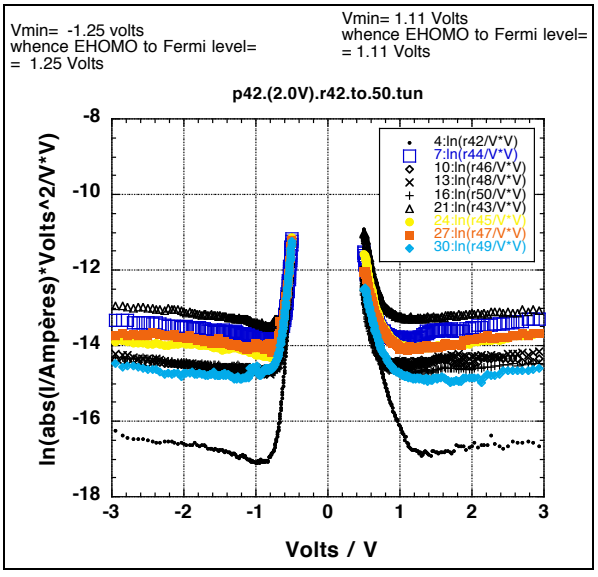

Figure T.

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Pad 44 (1.0 Volt) runs (1-2)

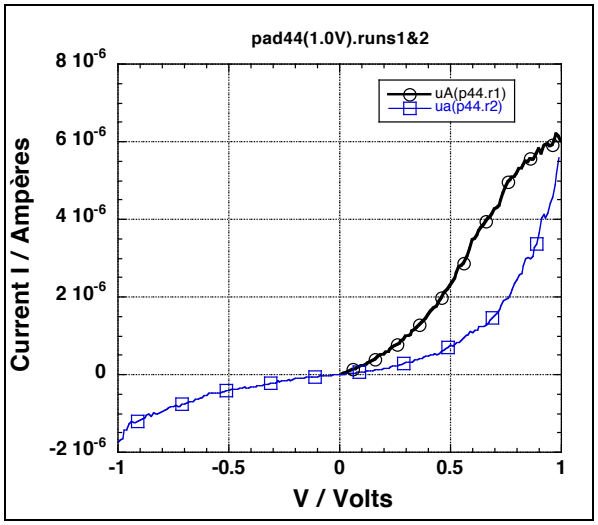

Figure U.

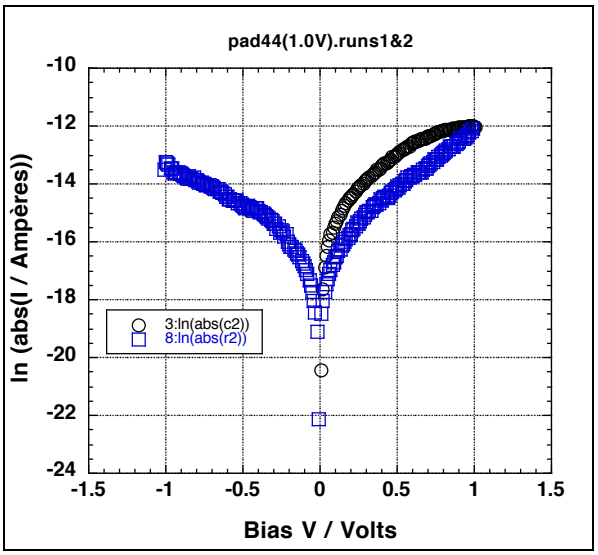

Figure V.

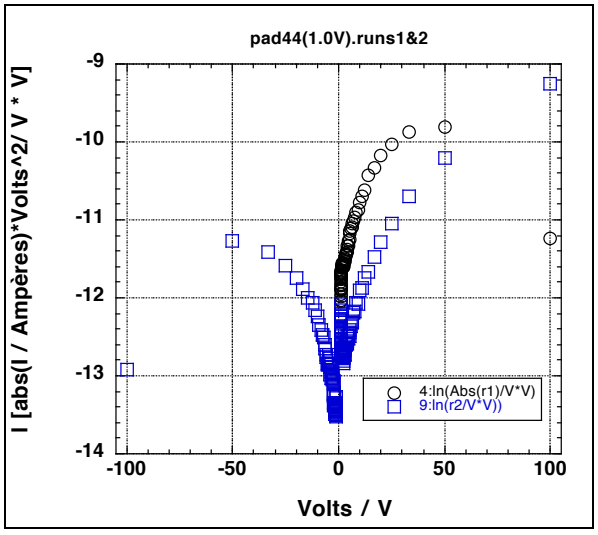

Figure W.

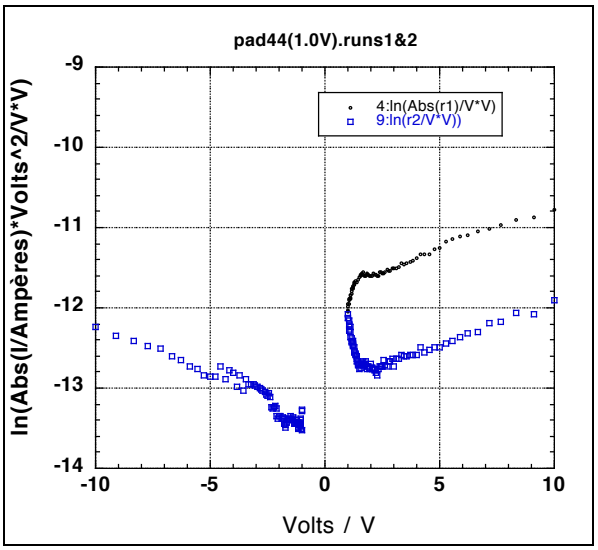

Figure X.

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Pad 45 (1.0 Volt) runs (6-10)

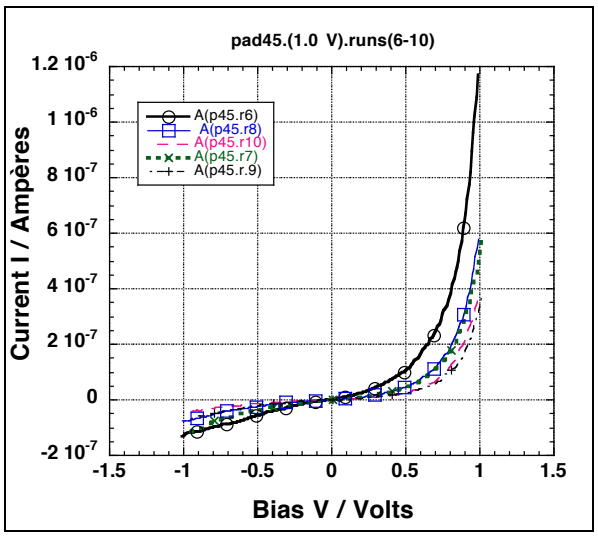


Figure Y.

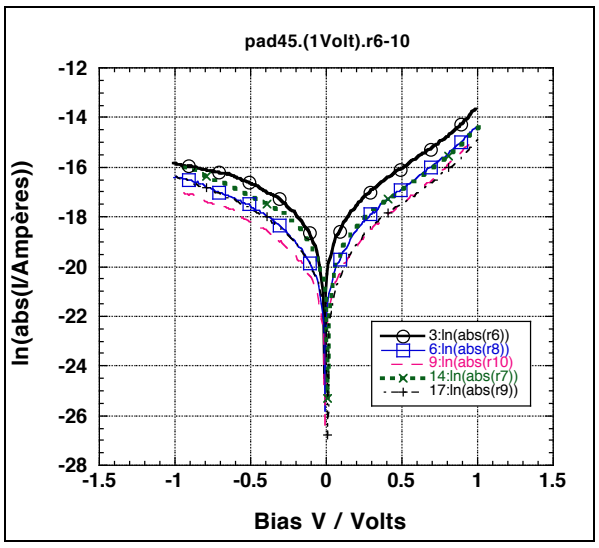
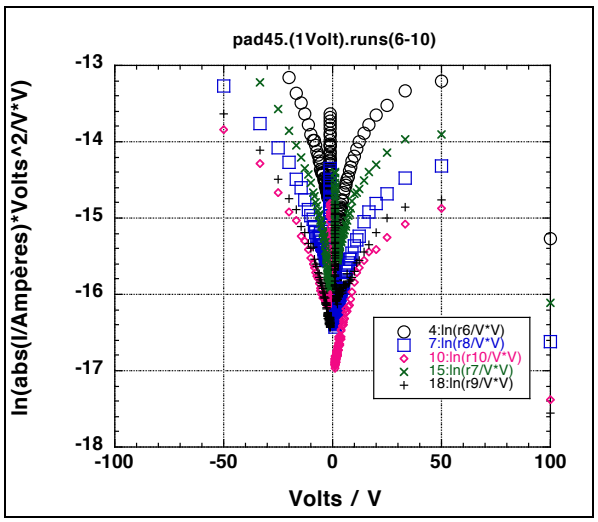


Figure Z.



Figue AA.

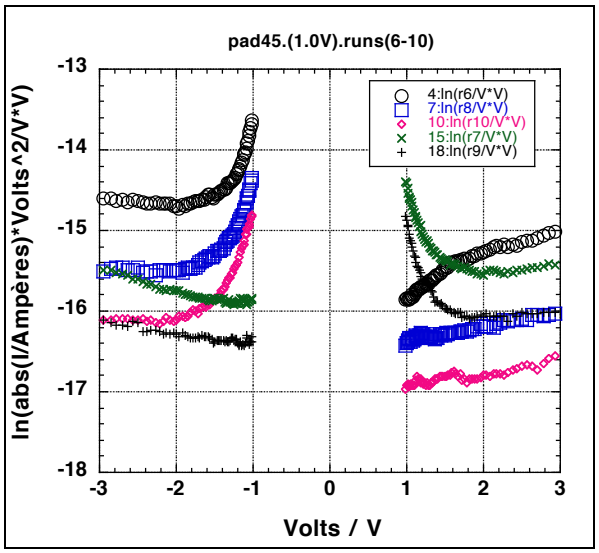


Figure AB.

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Pad 45 (1.5 Volts) runs (11-16)

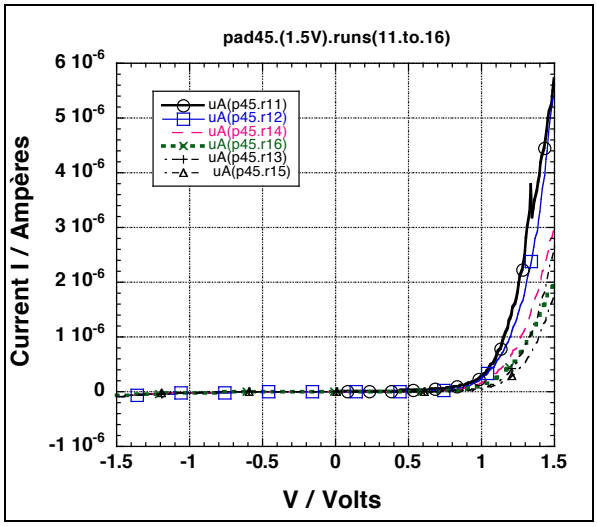

Figure AC.

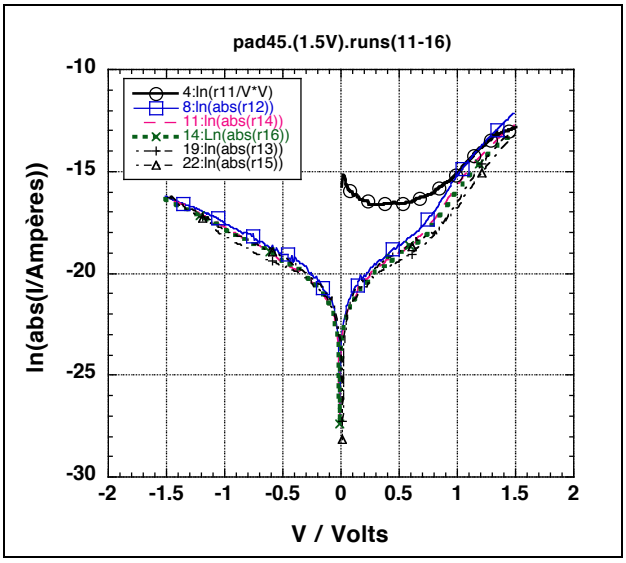

Figure AD.

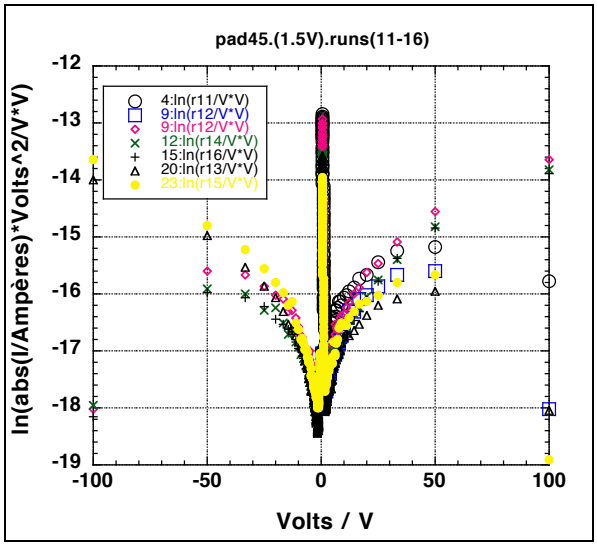

Figure AE.

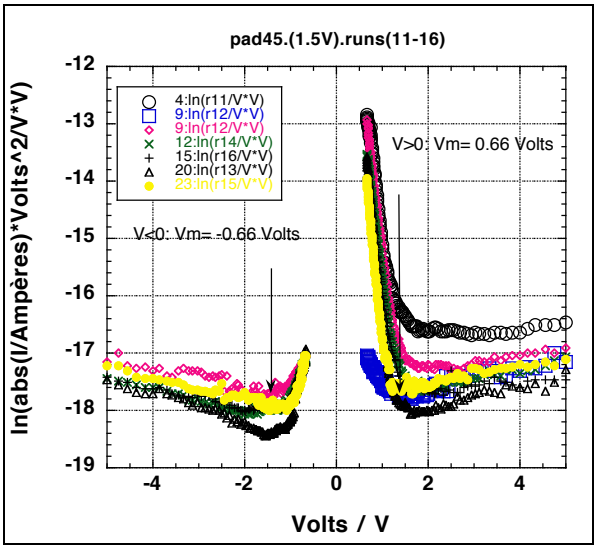

Figure AF.

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Pad 45 (2.0 Volts) runs (18-23)

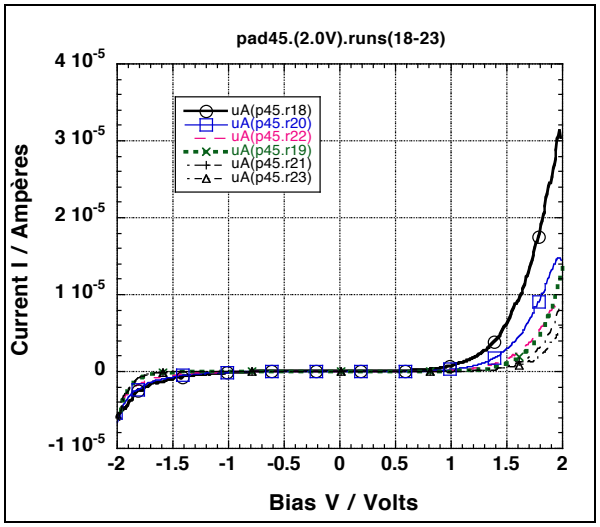

Figure AG.

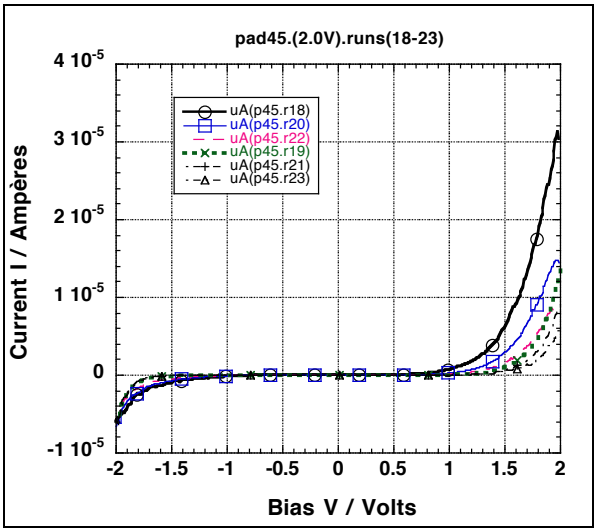

Figure AH.

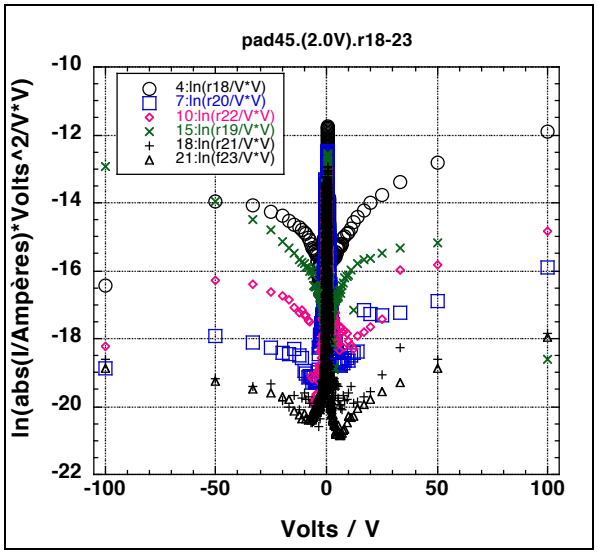

Figure AI.

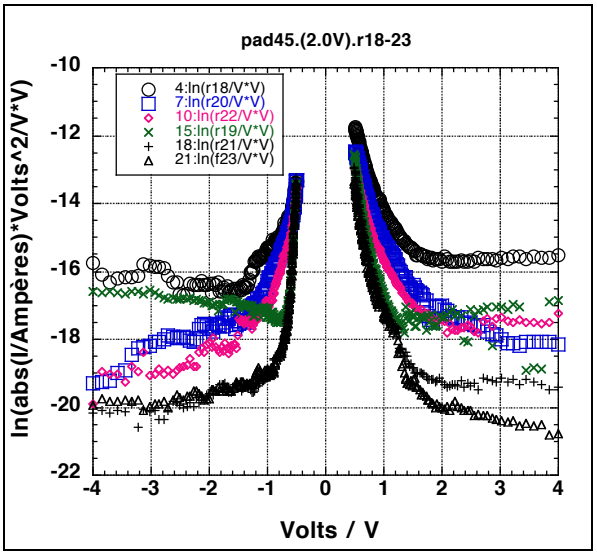

Figure AJ.

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Pad 45 (2.5 Volts) runs (26-40)

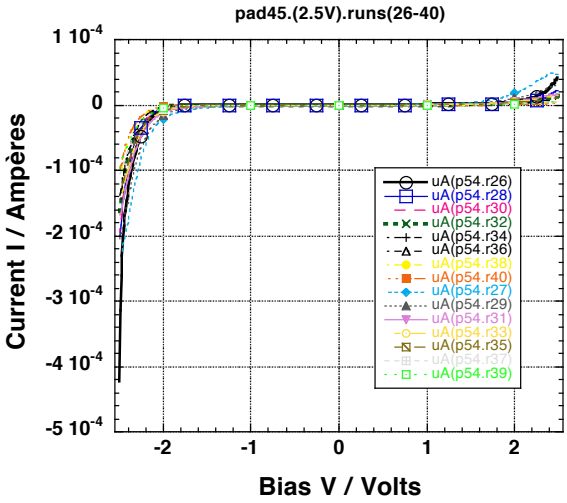

Figure AK.

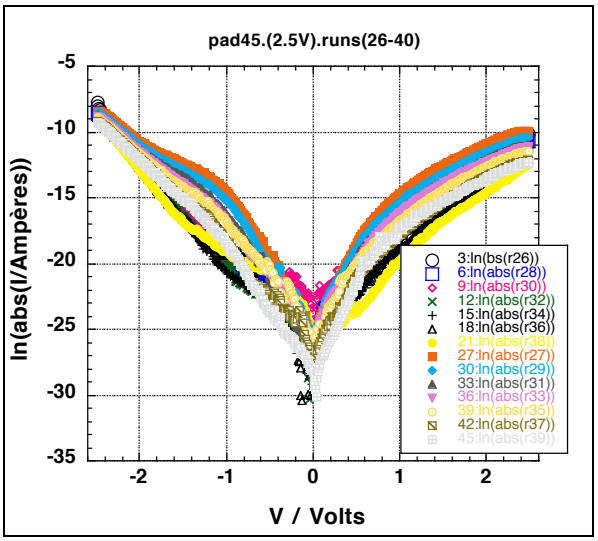

Figure AL.

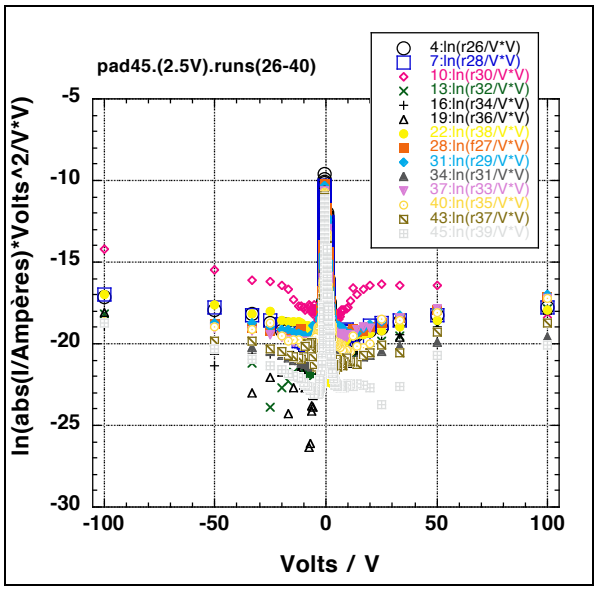

Figure AM.

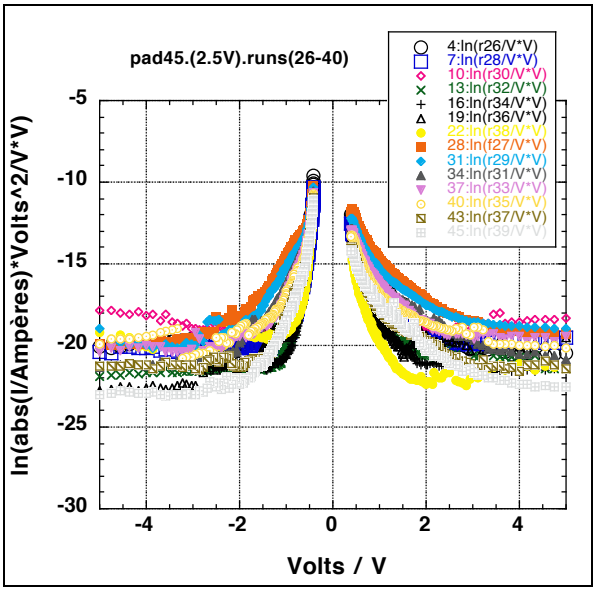

Figure AN.

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Pad 45 (2.5 Volts) runs (26-40)…afterthought

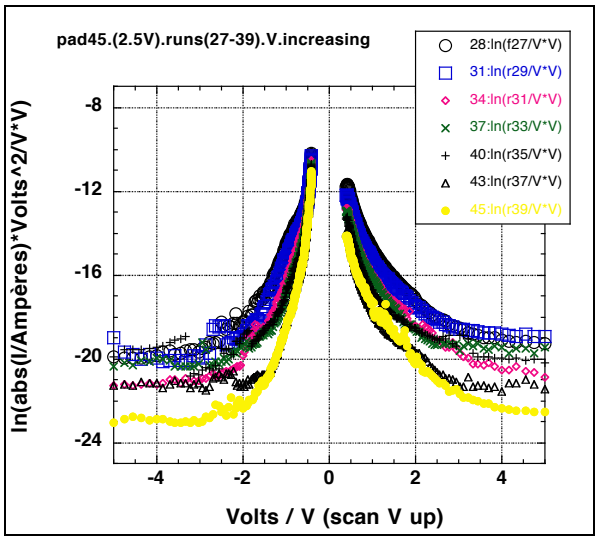

Figure AO. FN with V increasing

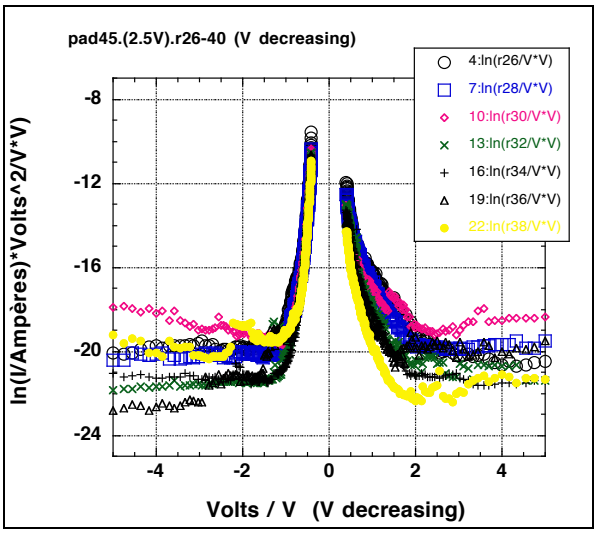

Figure AP. FN with V decreasing

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Pad 46 (1.0 Volt) runs (6-11)

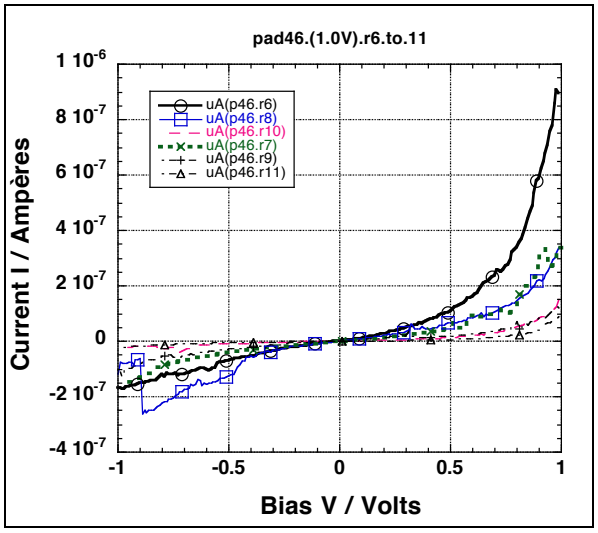

Figure AQ.

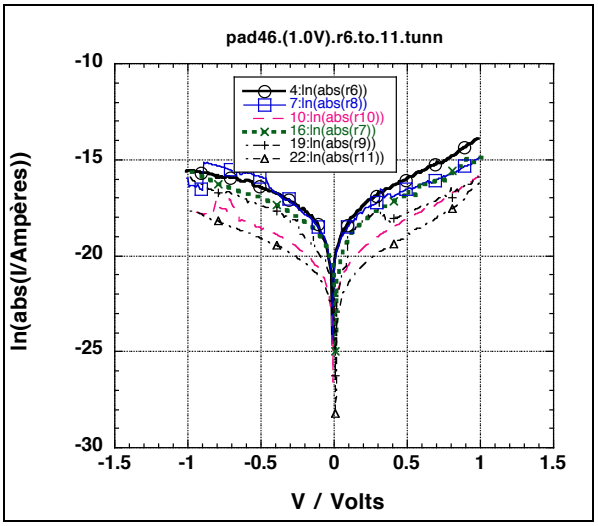

Figure AR.

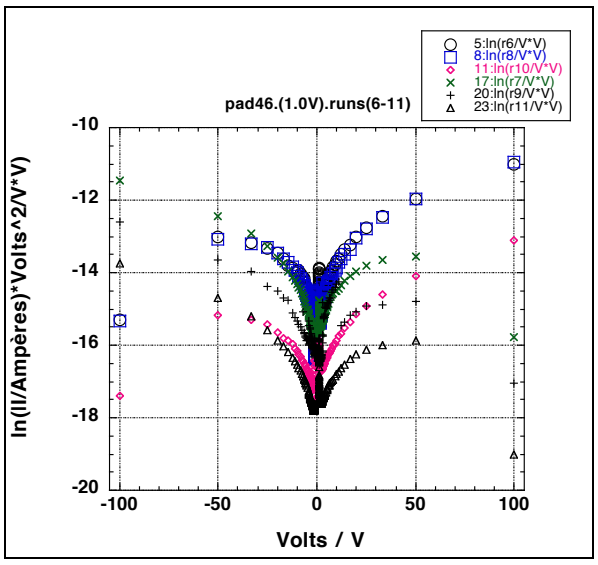

Figure AS.

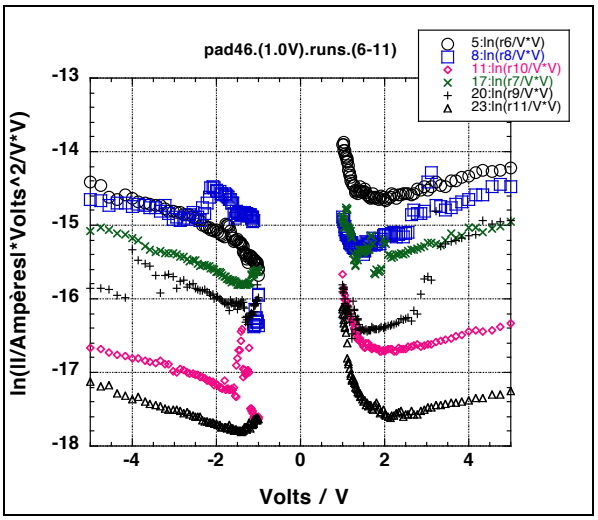

Figure AT.

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Pad 46 (1.5 Volts) runs (12-19)….unstable

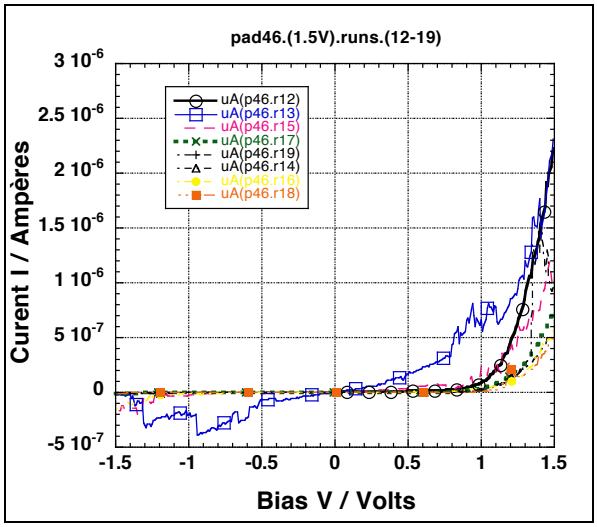

Figure AU.

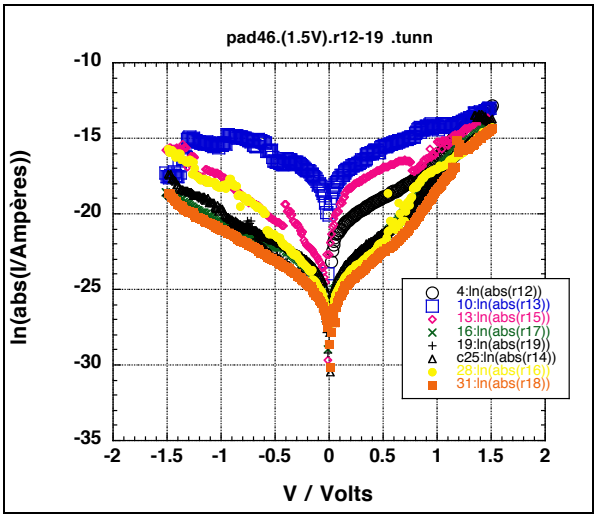

Figure AV.

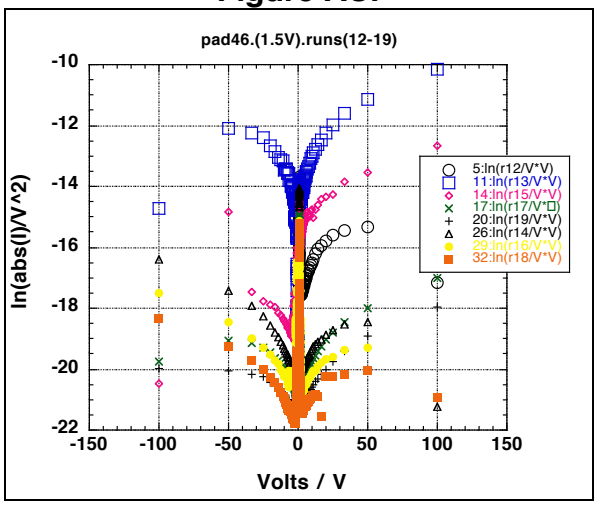

Figure AW.

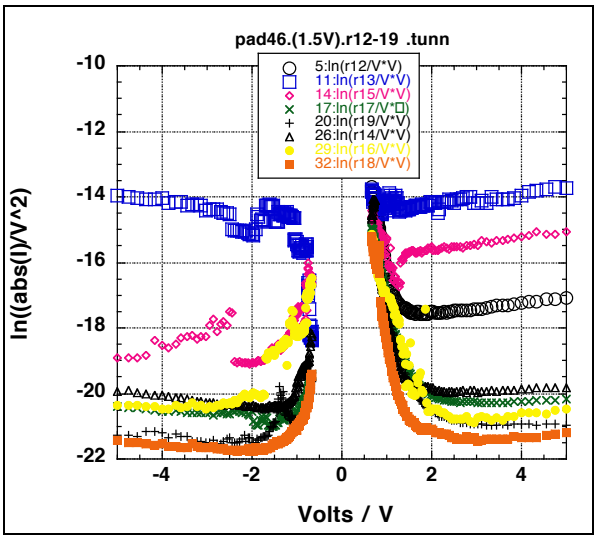

Figure AX.

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Pad 46 (2.0 Volts) runs (21-23)

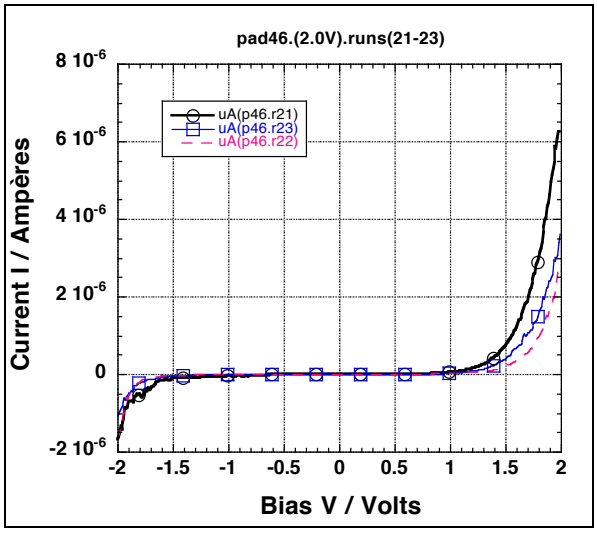

Figure AY.

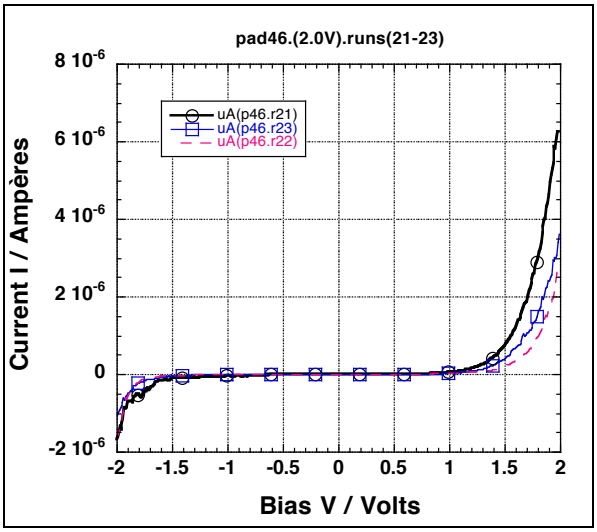

Figure AZ.

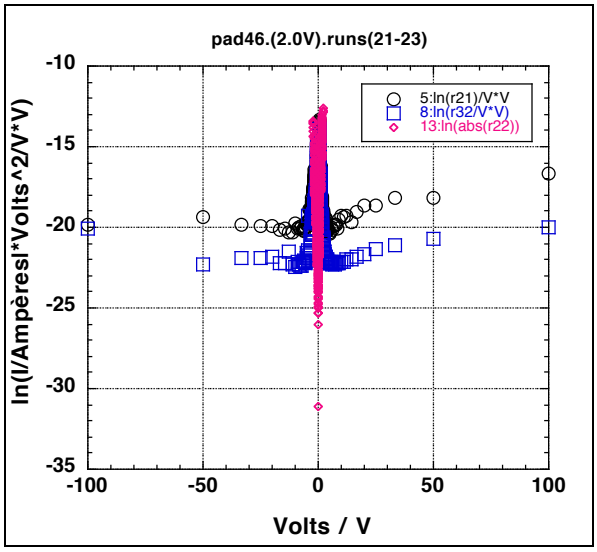

Figure BA.

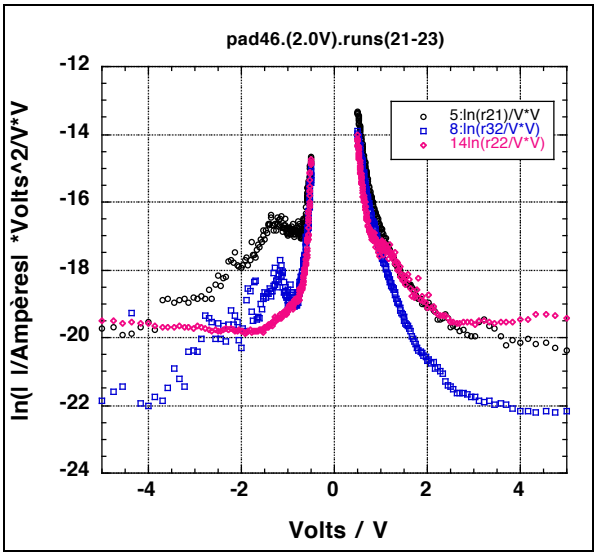

Figure BB.

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Pad 46 (2.5 Volts) runs (25-30)

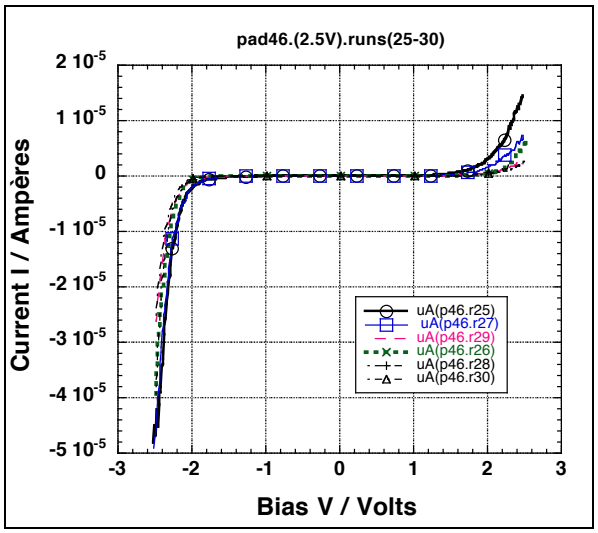

Figure BC.

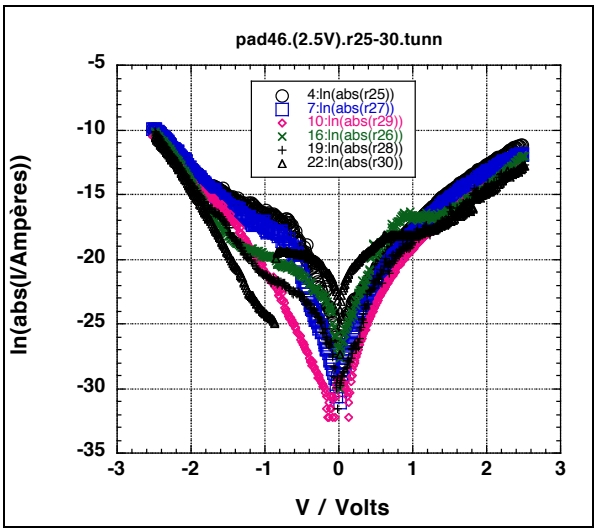

Figure BD.

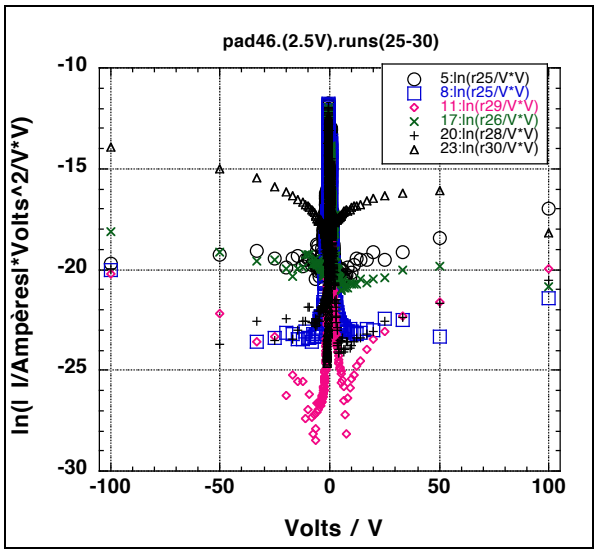

Figure BE.

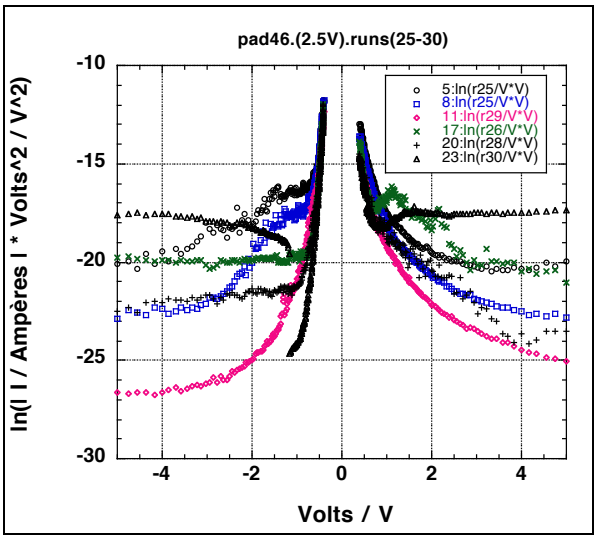

Figure BF.

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Pad 48 (1.0 Volt) runs (6-9)

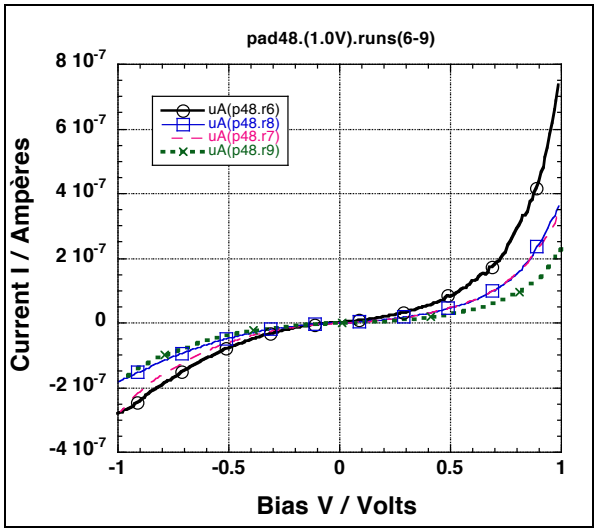

Figure BG.

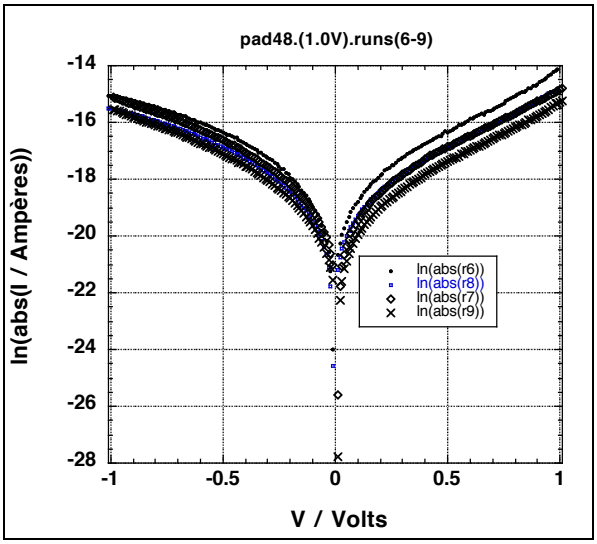

Figure BH.

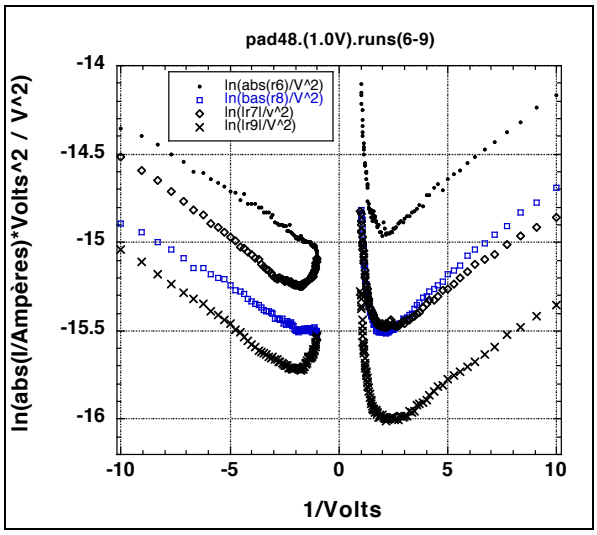

Figure BI.

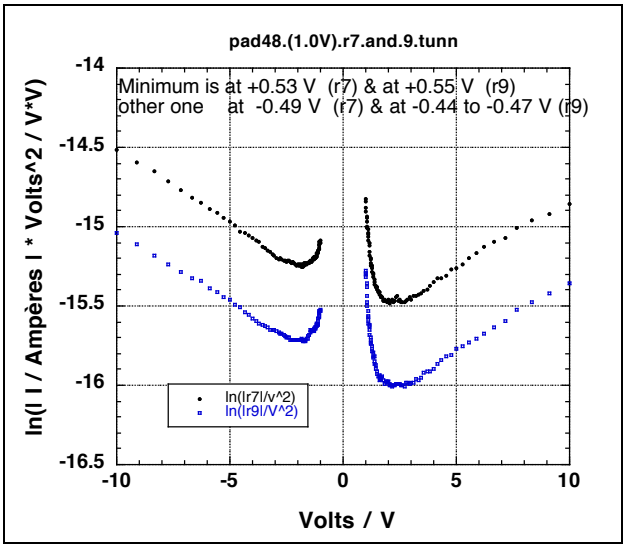

Figure BJ.

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Pad 48 (1.5 Volts) runs (11-16)

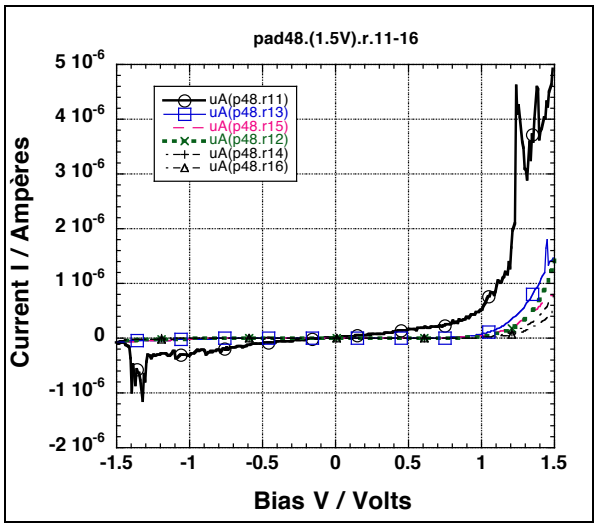

Figure BK.

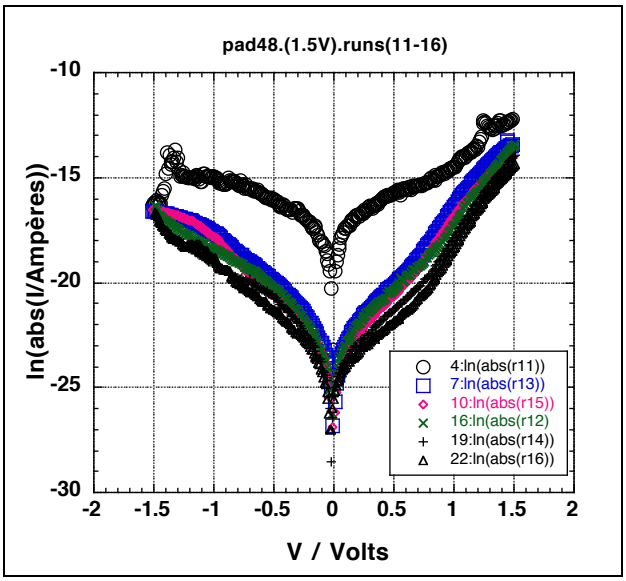

Figure BL.

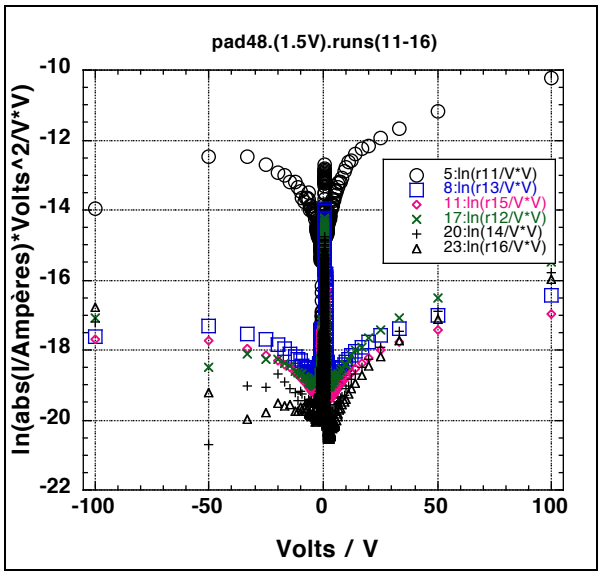

Figure BM.

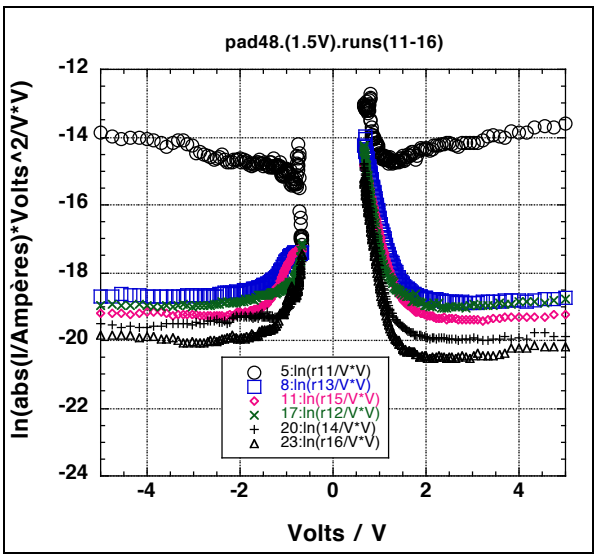

Figure BN.

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Pad 48 (2.0 Volts) runs (18-23)

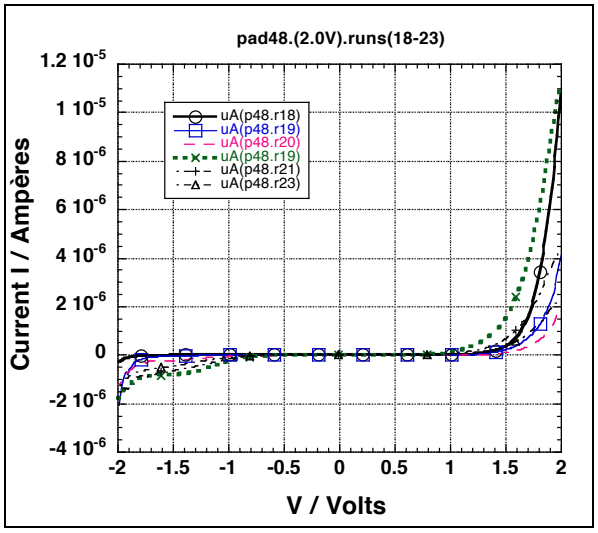

Figure BO.

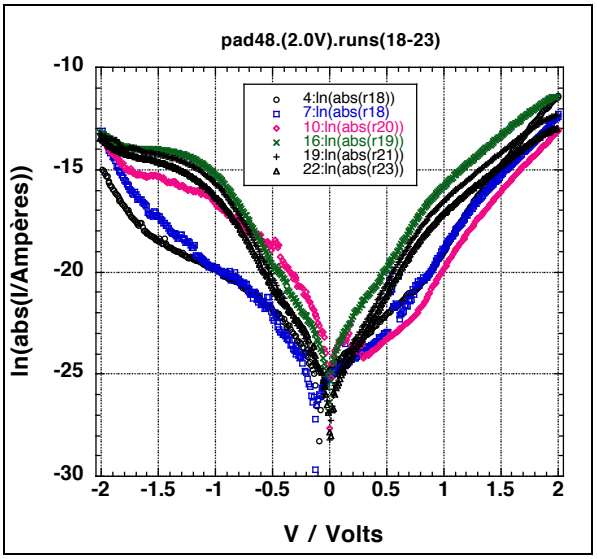

Figure BP.

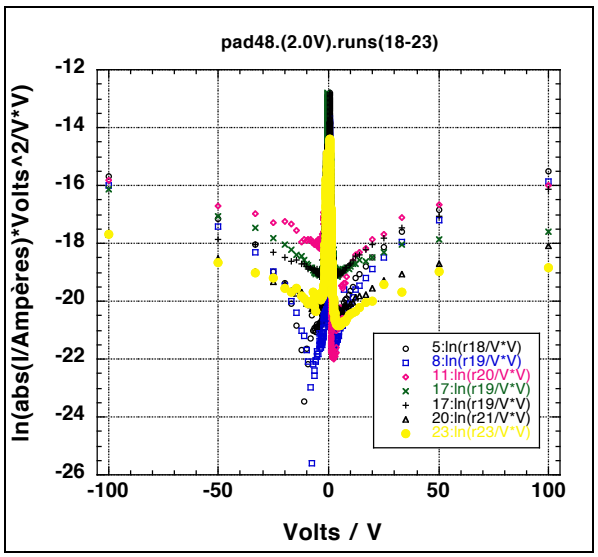

Figure BQ.

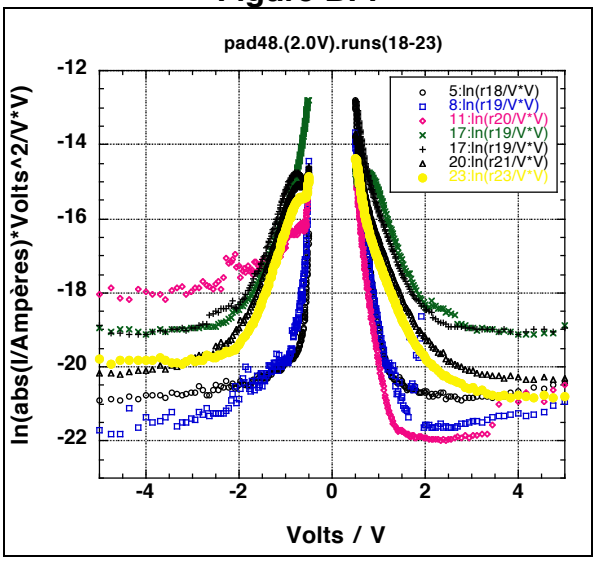

Figure BR.

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Pad 48 (2.5 Volts) runs (26-34)

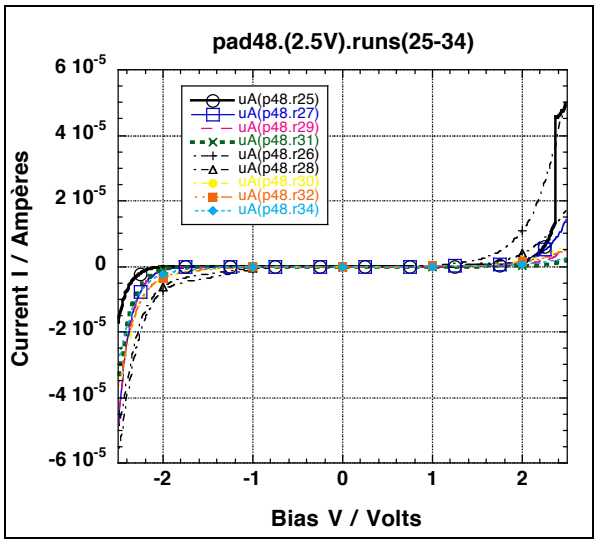

Figure BS.

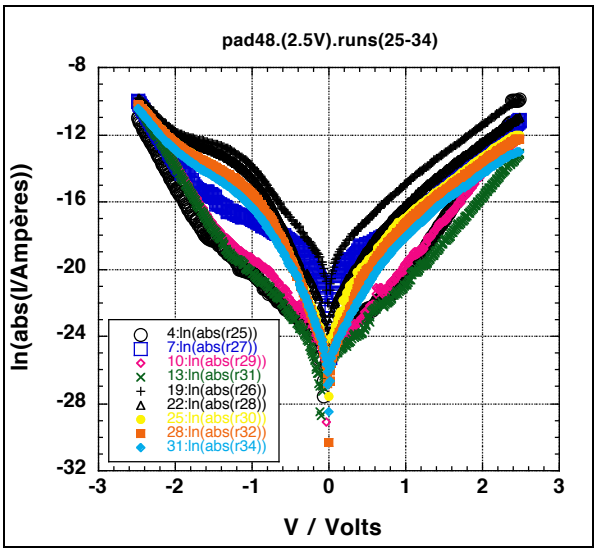

Figure BT.

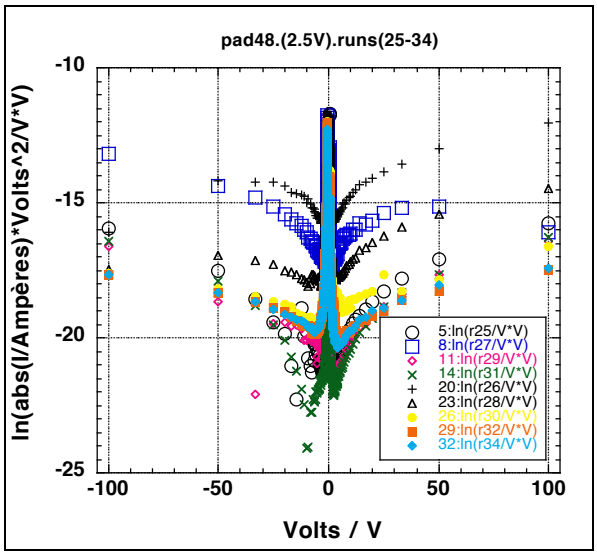

Figure BU.

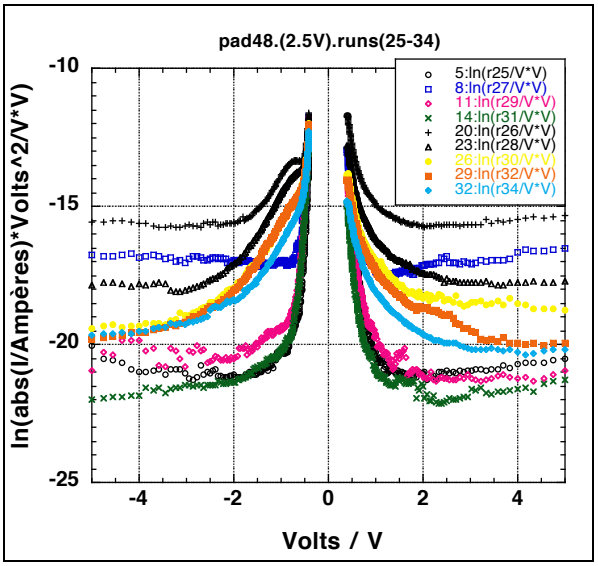

Figure BV.

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Pad 48 (3.0 Volts) runs (36-38)

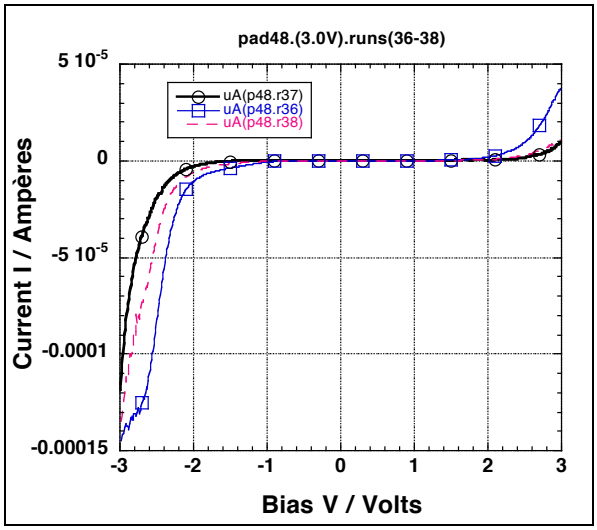

Figure BW.

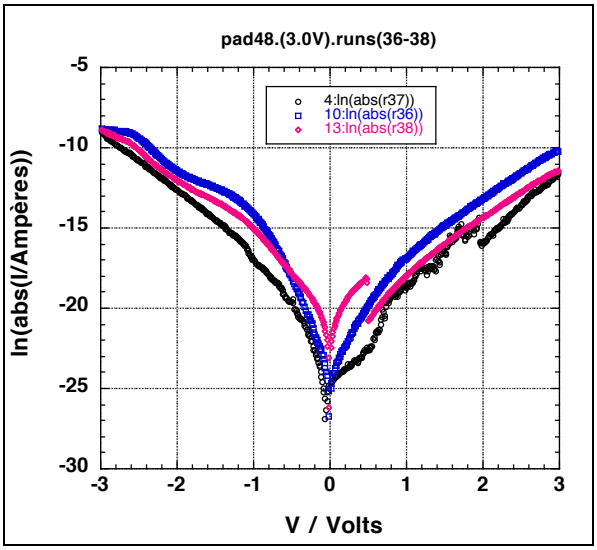

Figure BX.

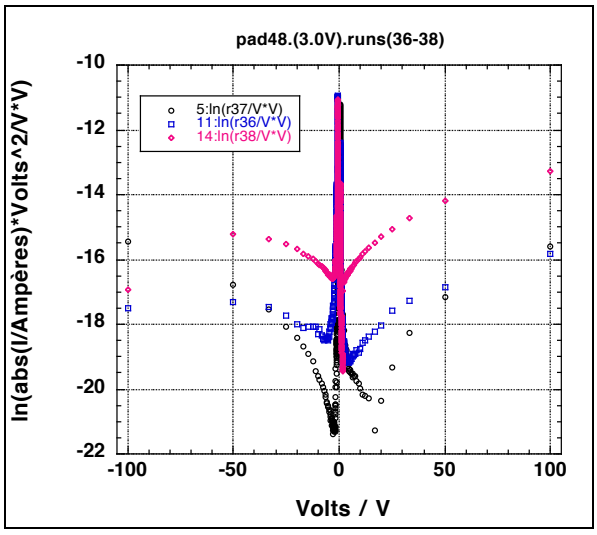

Figure BY.

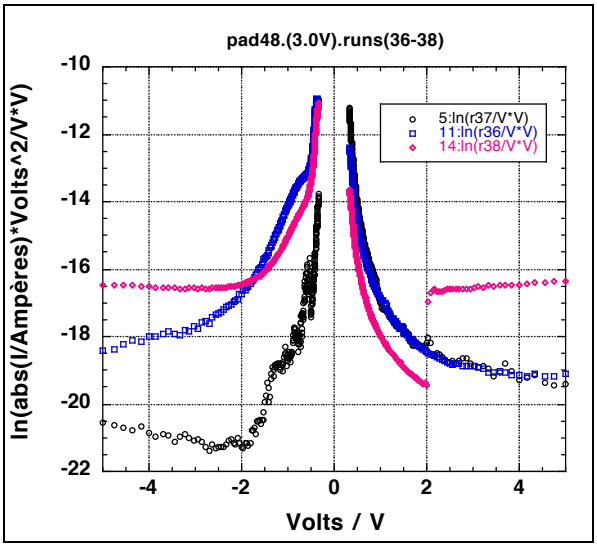

Figure BZ.

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Pad 49 (1.0 Volt) runs (5-8)

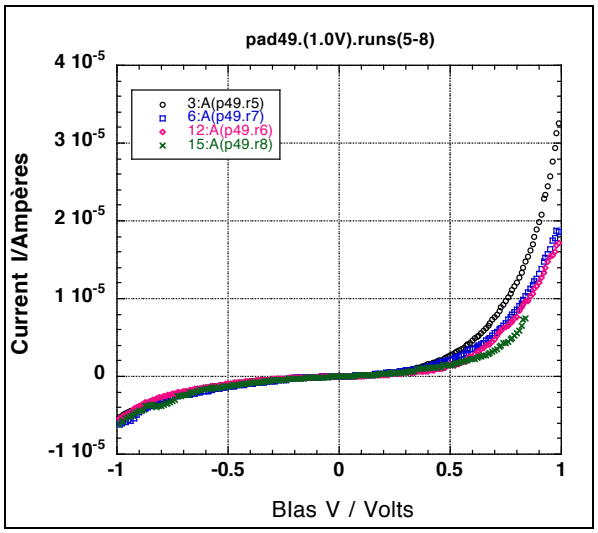

Figure CA.

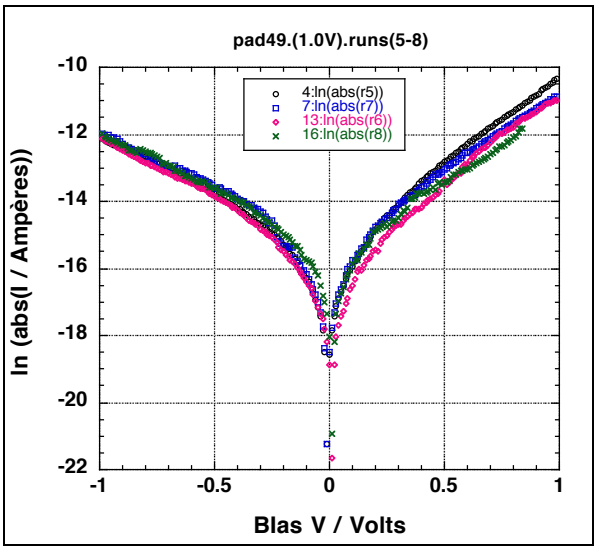

Figure CB.

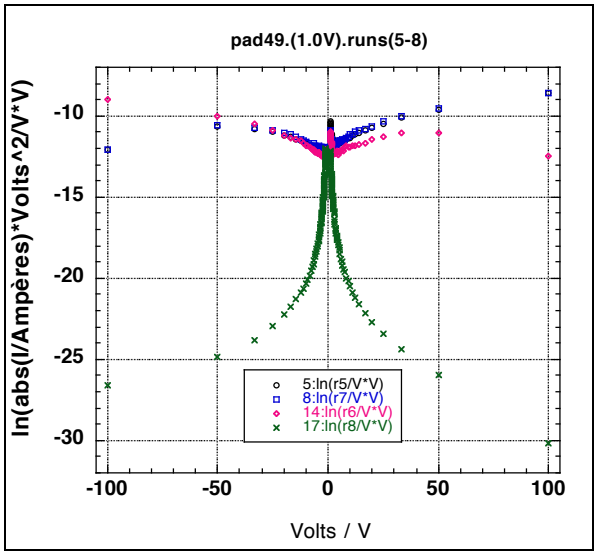

Figure CC.

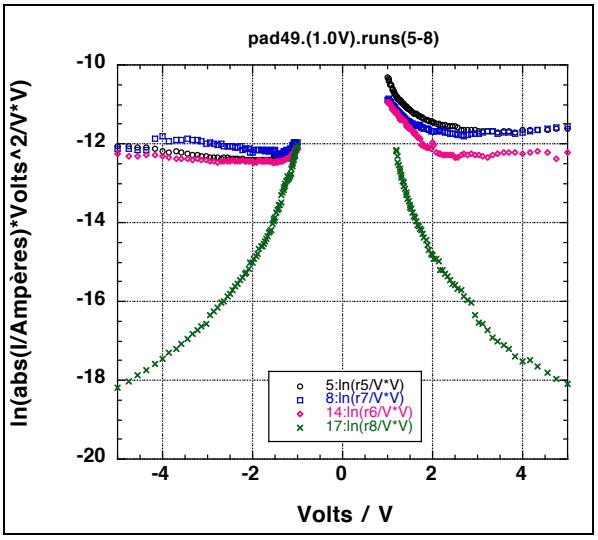

Figure CD.

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Pad 50 (1.0 Volt) runs (6-9)

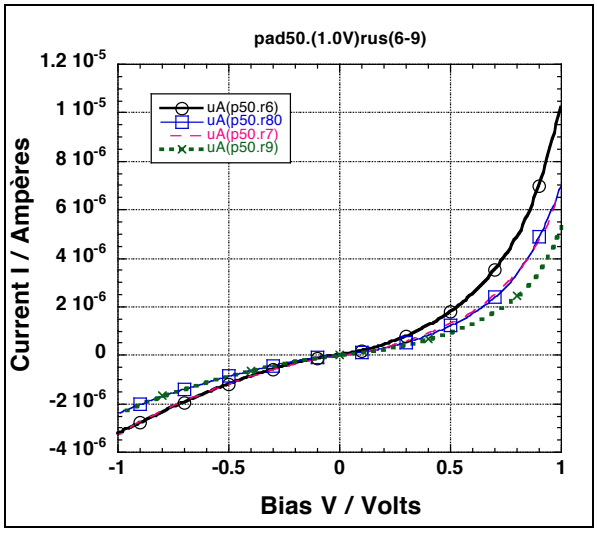

Figure CE.

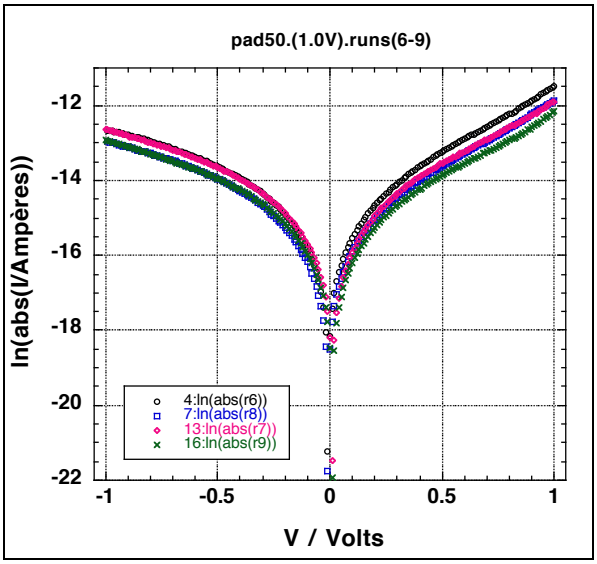

Figure CF.

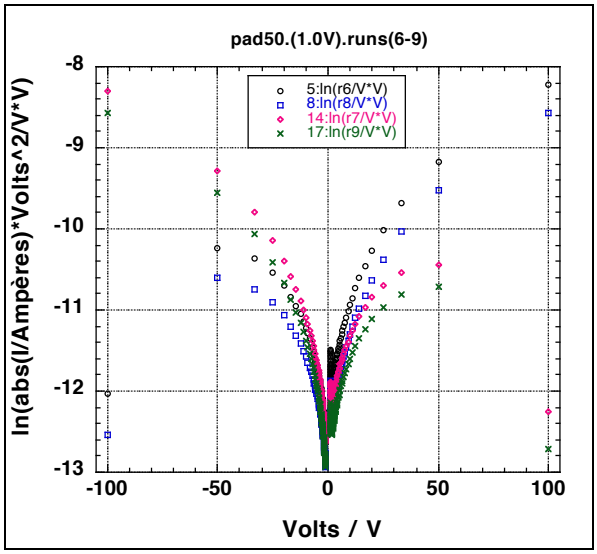

Figure CG.

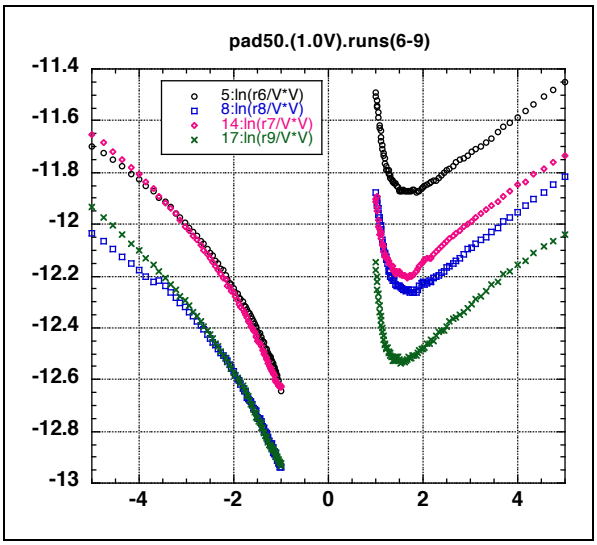

Figure CH.

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Pad 51 (1.0 Volt) runs (6-9)

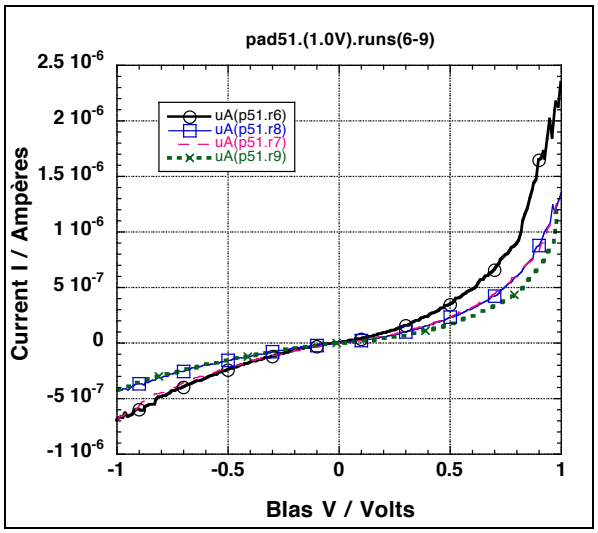

Figure CI.

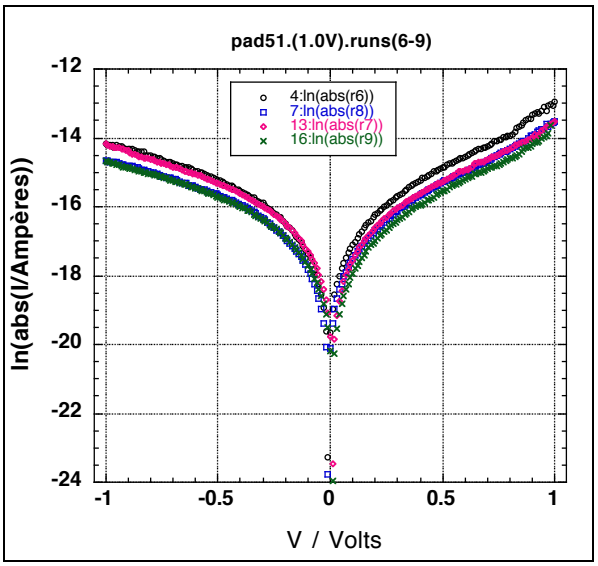

Figure CJ.

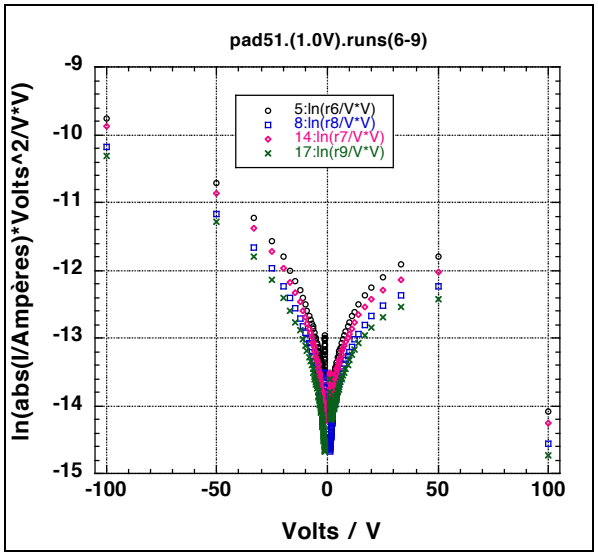

Figure CK.

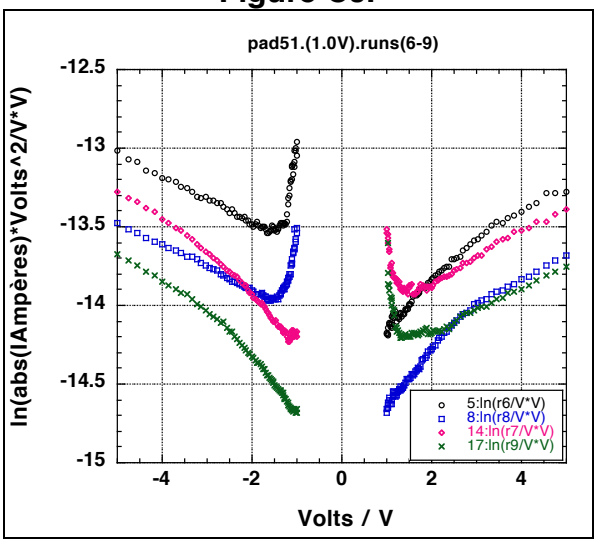

Figure CL.

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Pad 52 (1.0 Volt) runs (6-9)

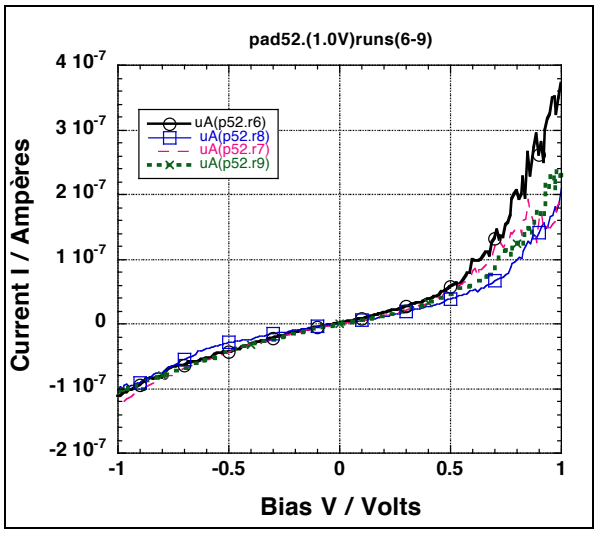

Figure CM.

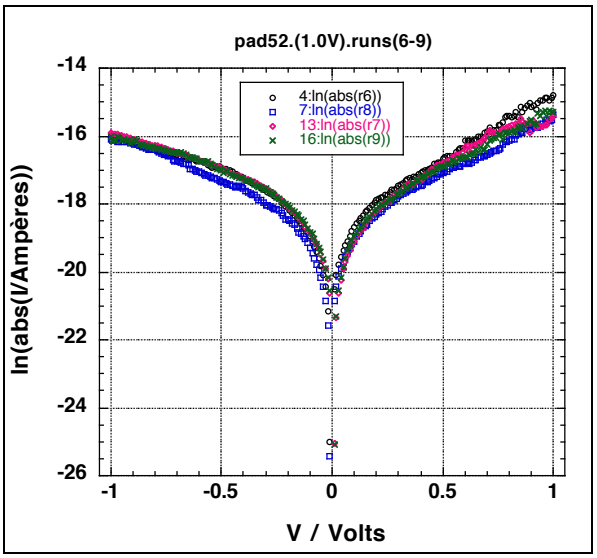

Figure CN.

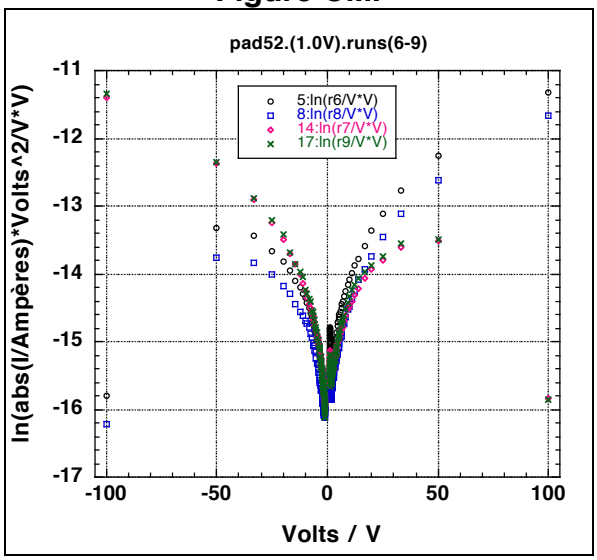

Figure CO.

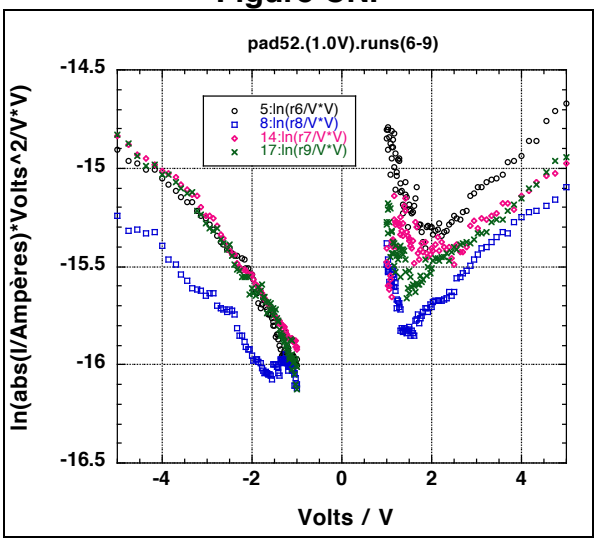

Figure CP.

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Pad 52 (1.0 Volt) runs (71-79) huge rectification ratios

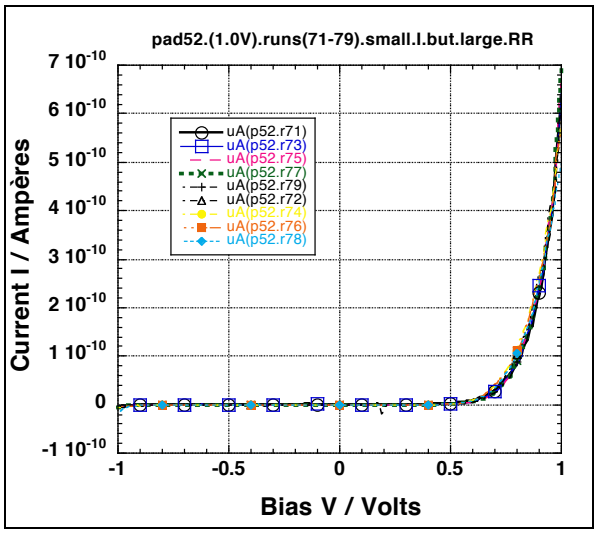

Figure CR.

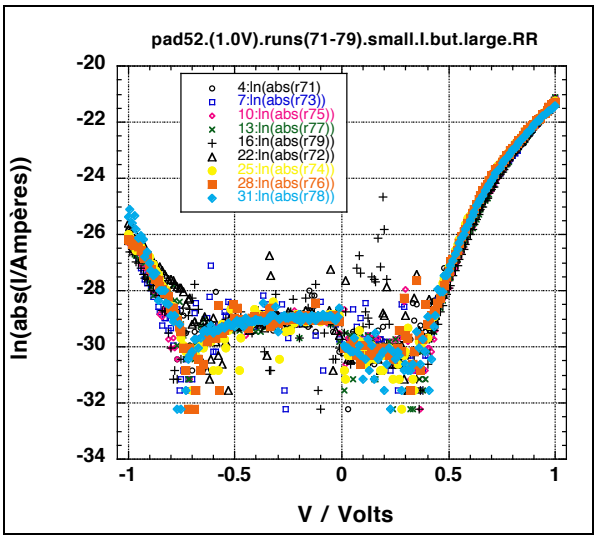

Figure CS.

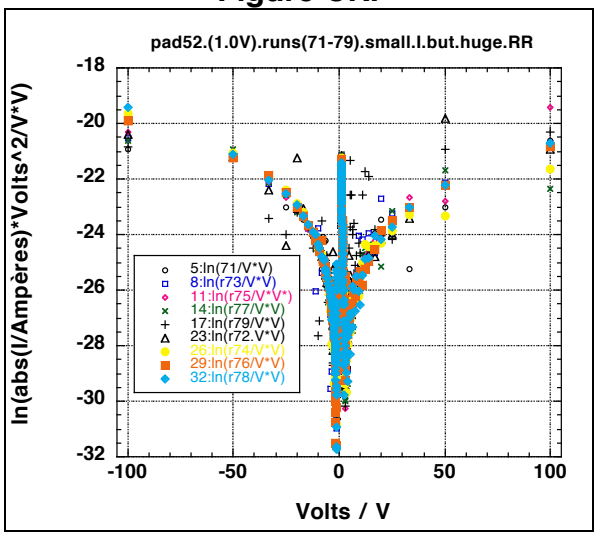

Figure CT.

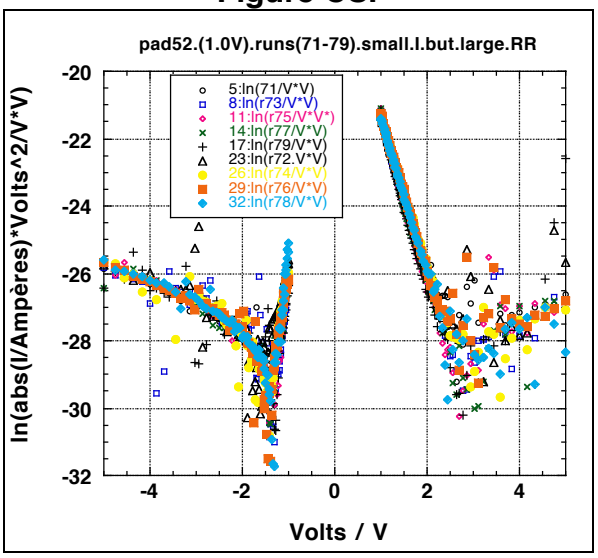

Figure CU.

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Pad 52 (1.5 Volts) runs (64-68)

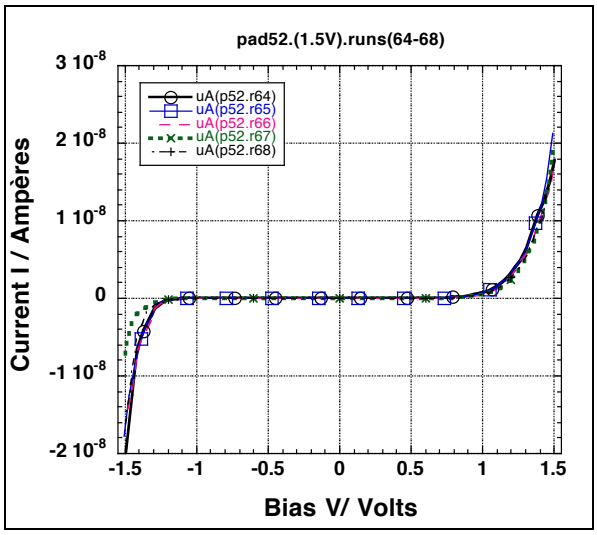

Figure CV.

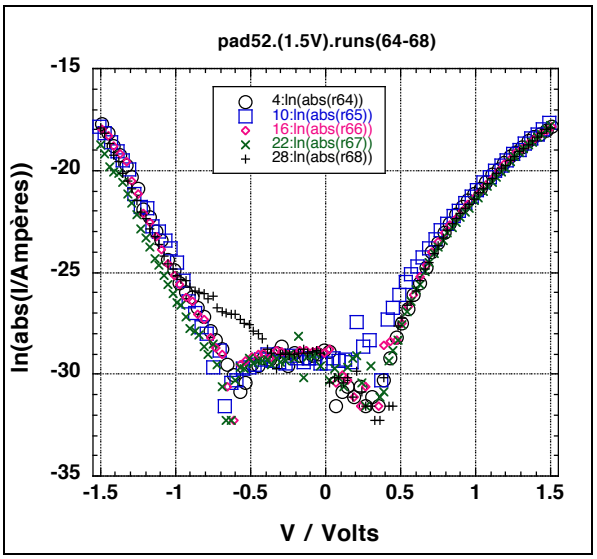

Figure CW.

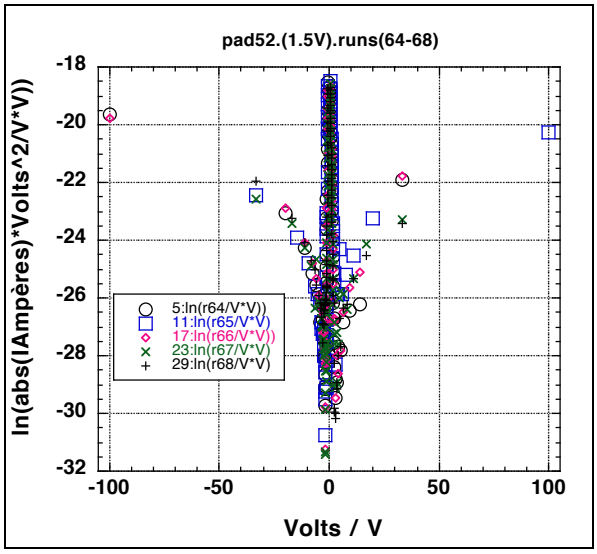

Figure CX.

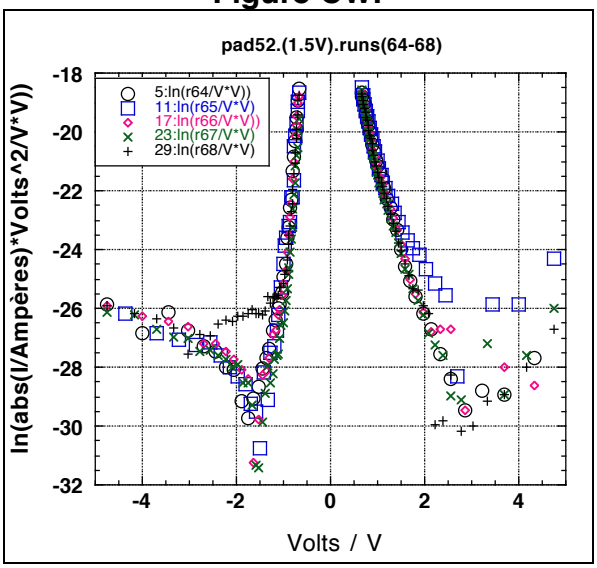

Figure CY.

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Pad 52 (2.0 Volts) runs (62-63)

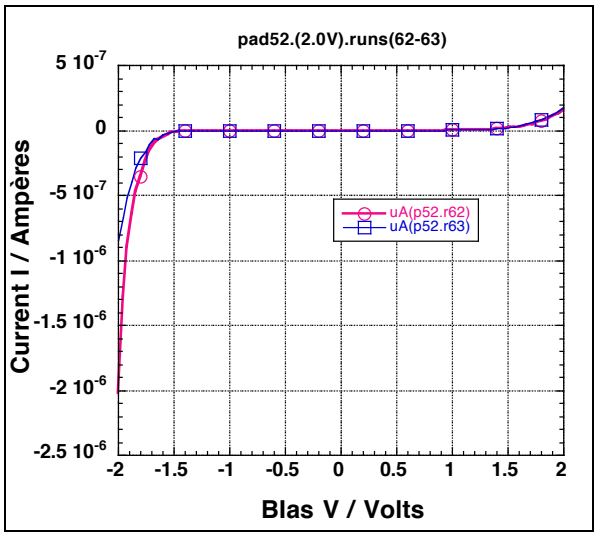

Figure CZ.

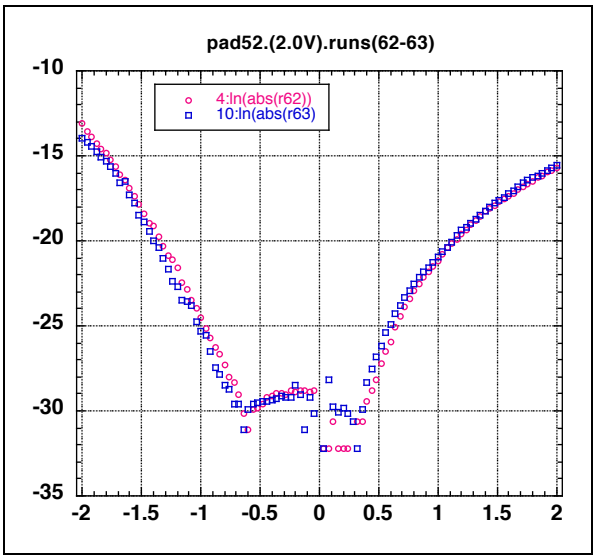

Figure DA.

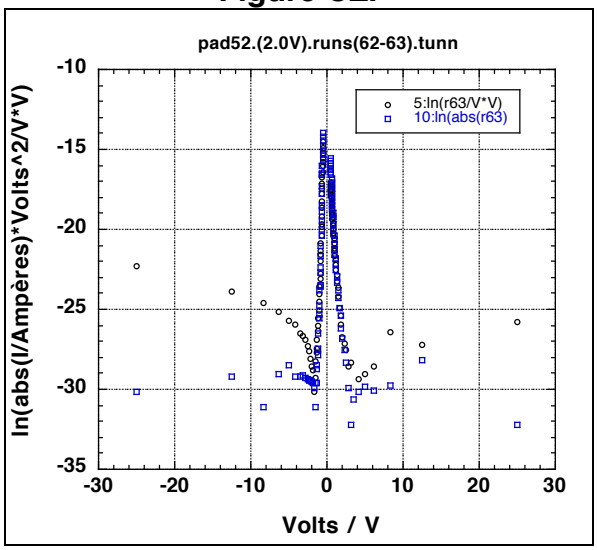

Figure DB.

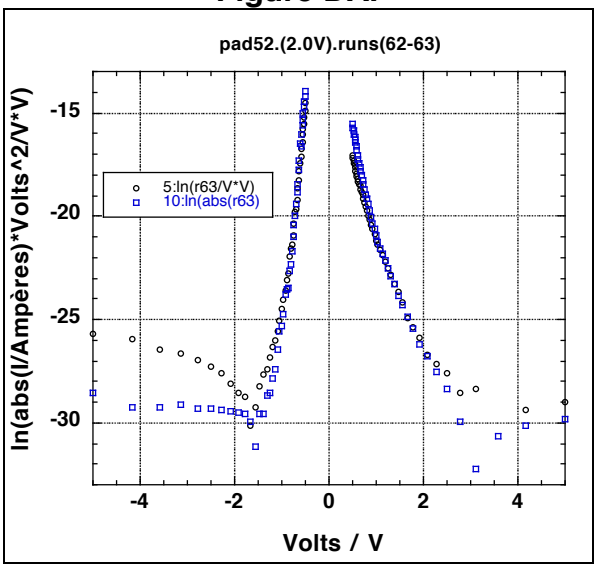

Figure DC.

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Pad 52 (2.5 Volts) runs (22-61)

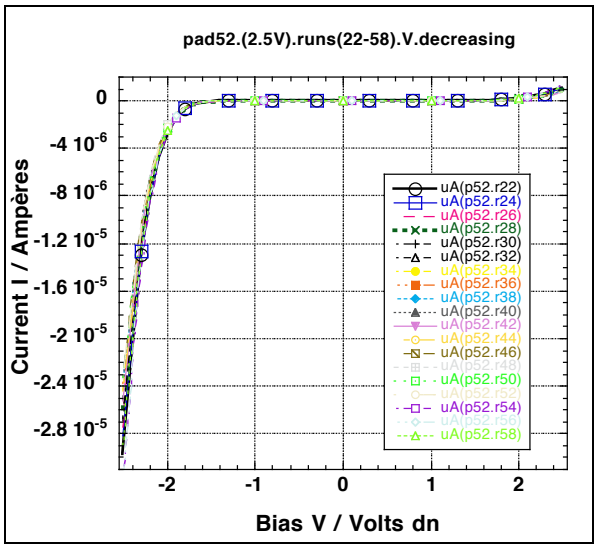

Figure DD.

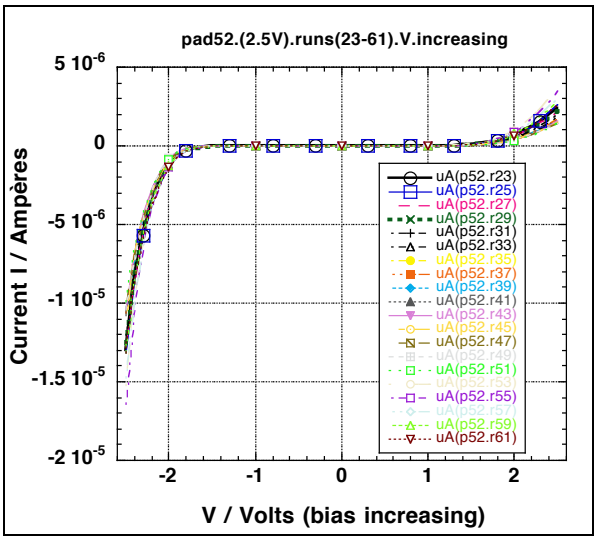

Figure DF.

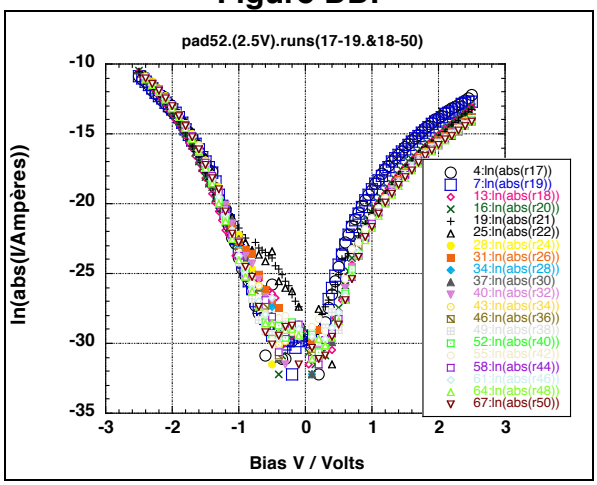

Figure DE.

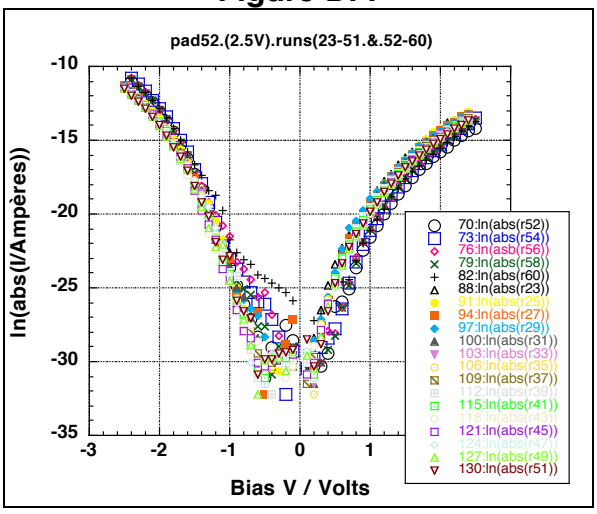

Figure DG.

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Pad 52 (2.5 Volts) runs (22-61) continued

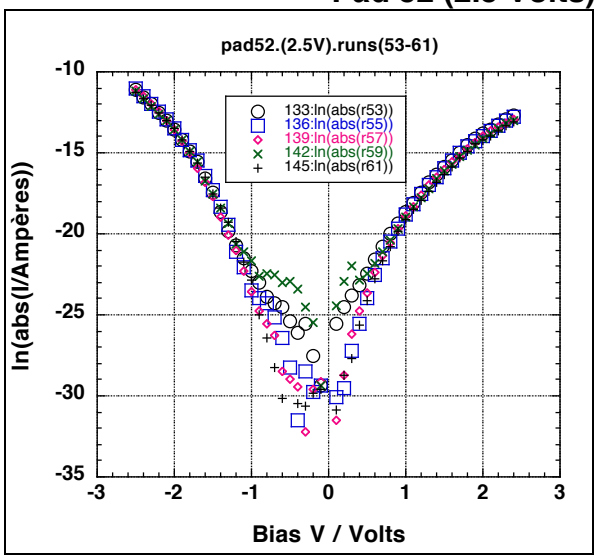

Figure DH.

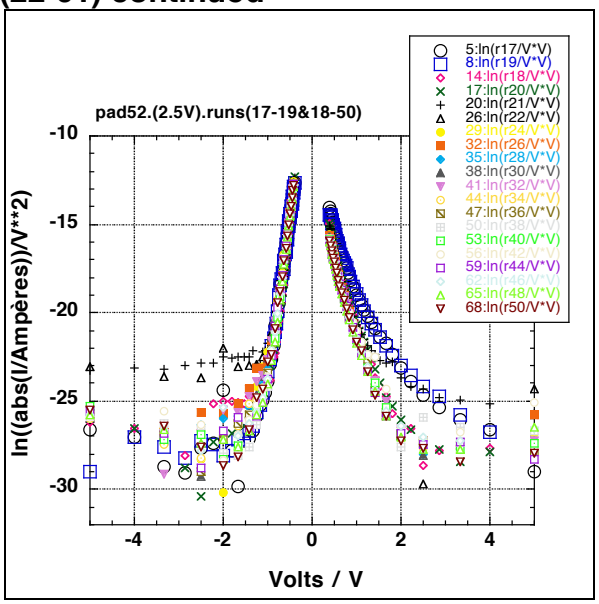

Figure DI.

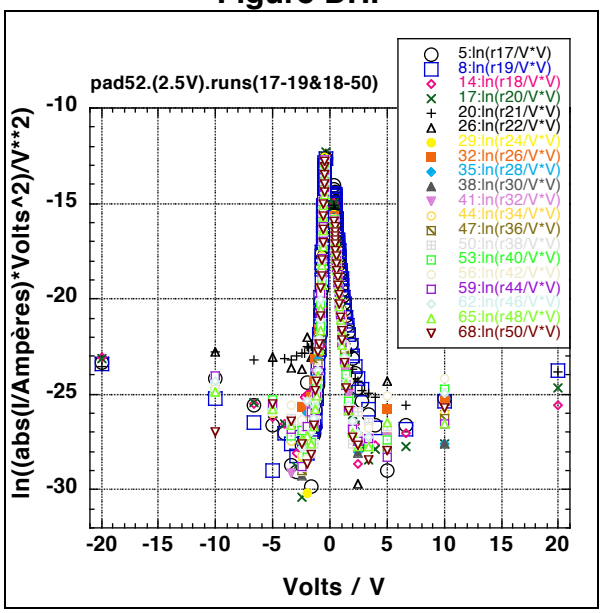

Figure DJ.

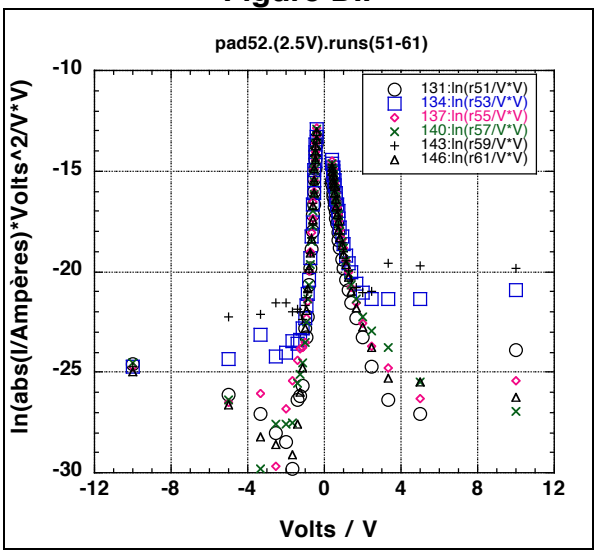

Figure DK.

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Pad 52 (2.5 Volts) runs (22-61) continued

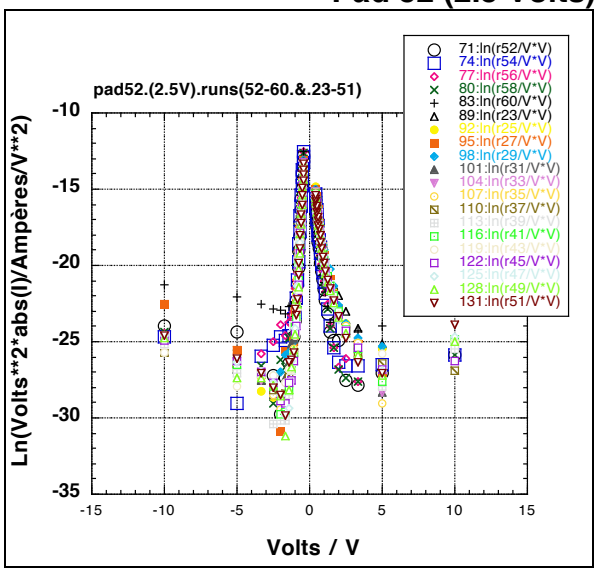

Figure DL.

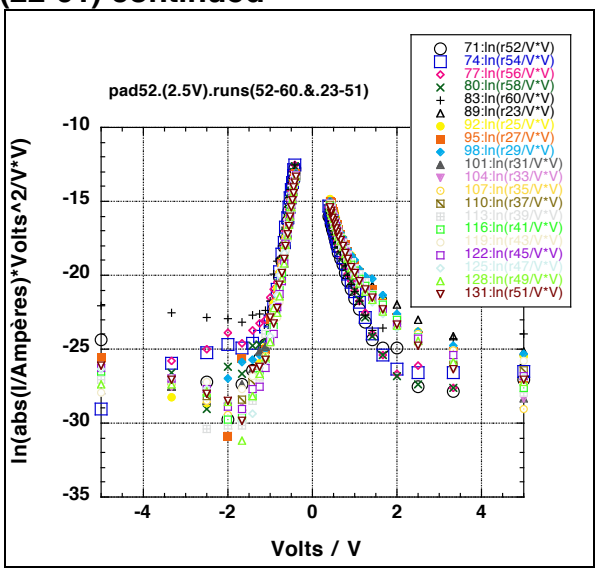

Figure DM.

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Pad 53 (1.0 Volt) runs (10-11)

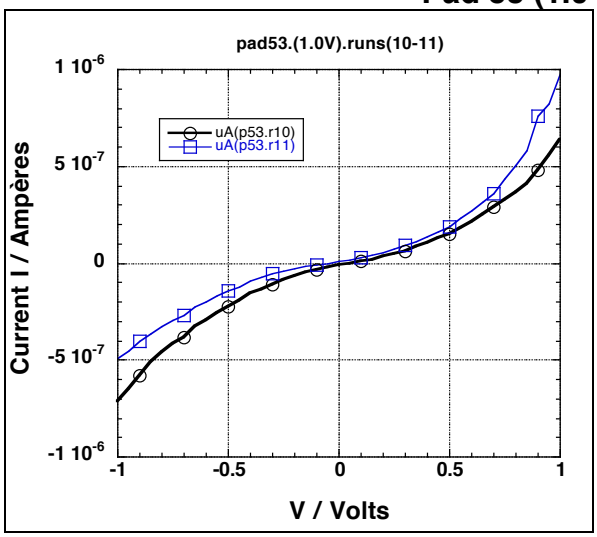

Figure DN.

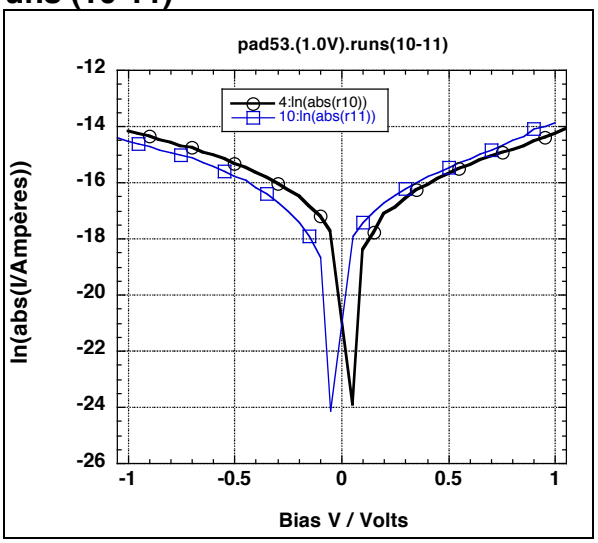

Figure DO.

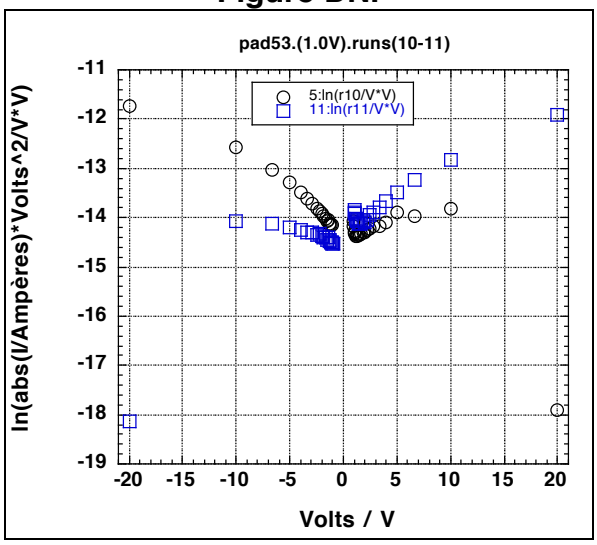

Figure DP.

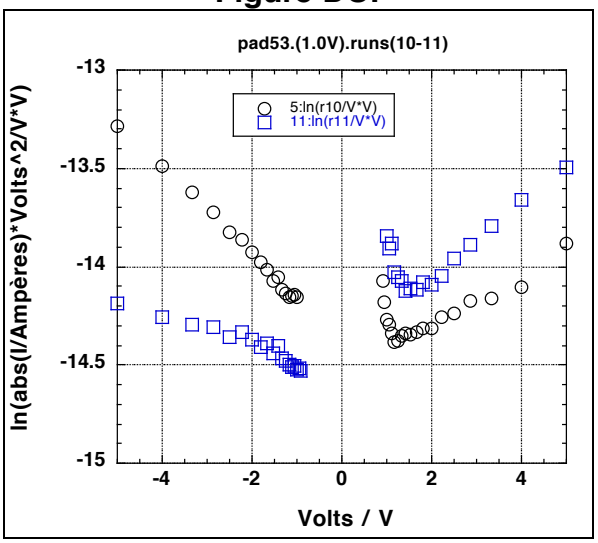

Figure DQ.

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Pad 54 (1.0 Volt) runs (5-72)

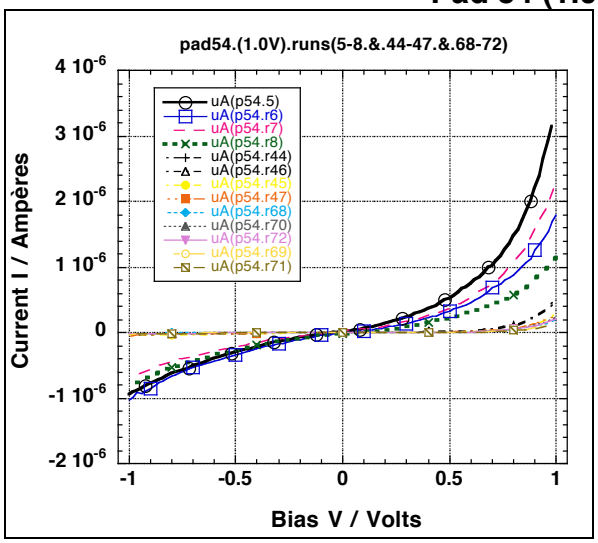

Figure DR.

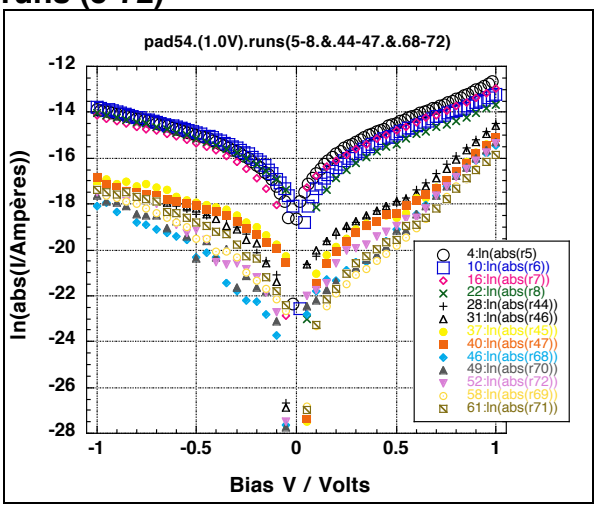

Figure DS.

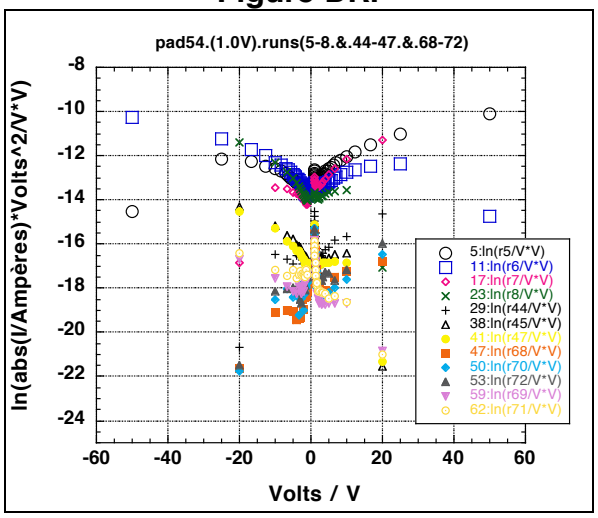

Figure DT.

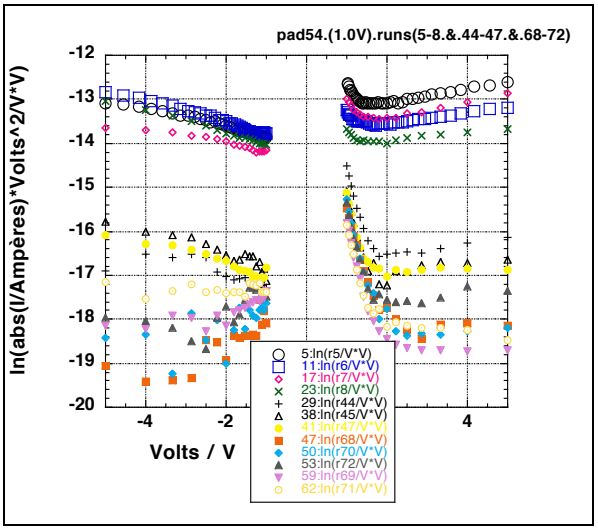

Figure DU.

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Pad 54 (1.5 Volts) runs (11-20)

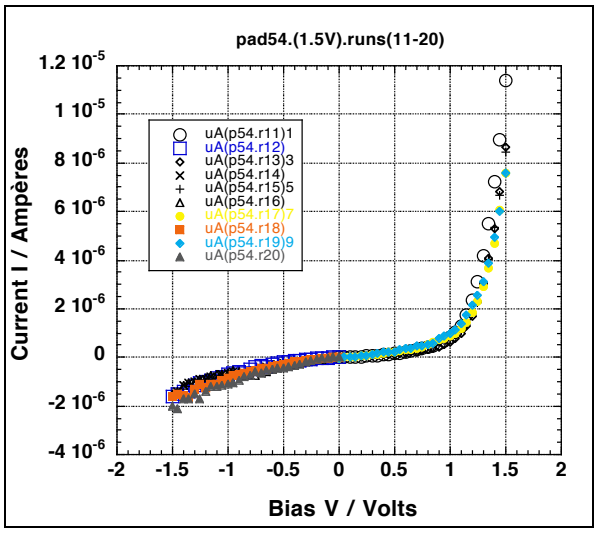

Figure DV.

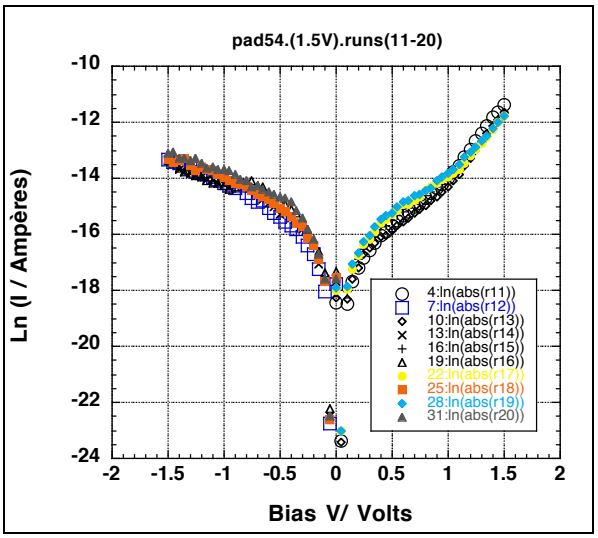

Figure DW.

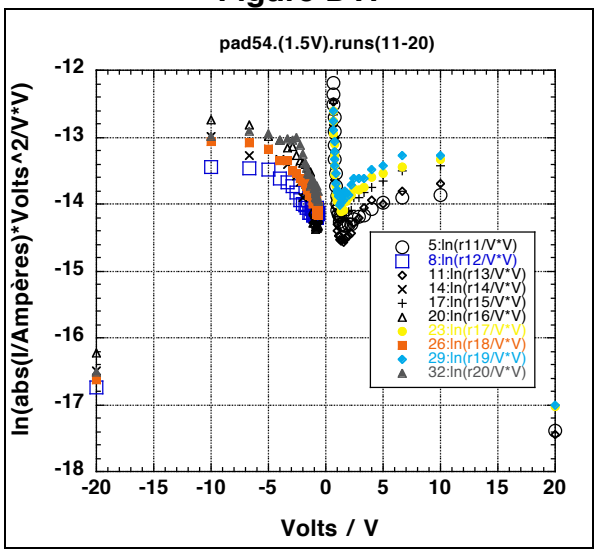

Figure DX.

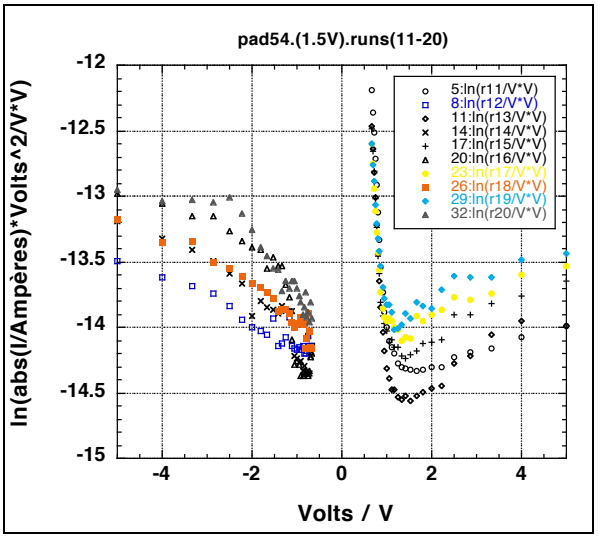

Figure DY.

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Pad 54 (1.5 Volts) runs (48-61 and 64-67)

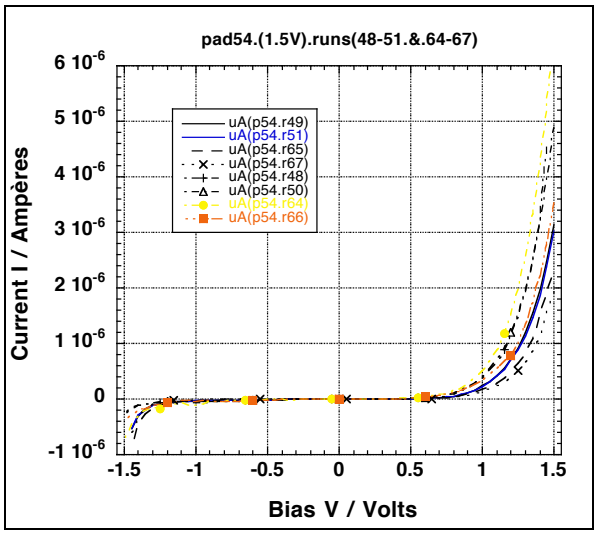

Figure DZ.

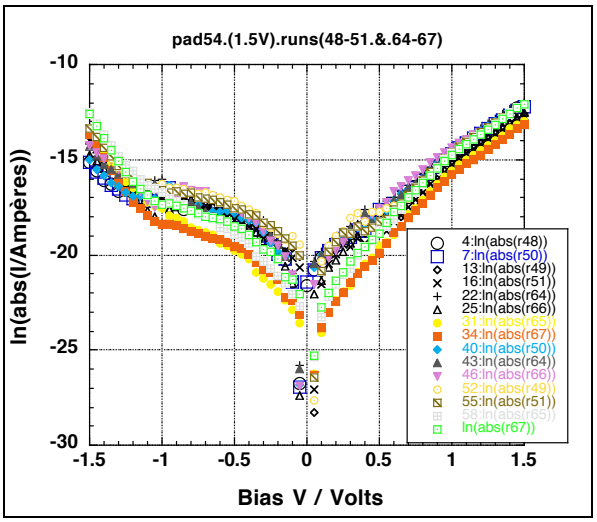

Figure EA.

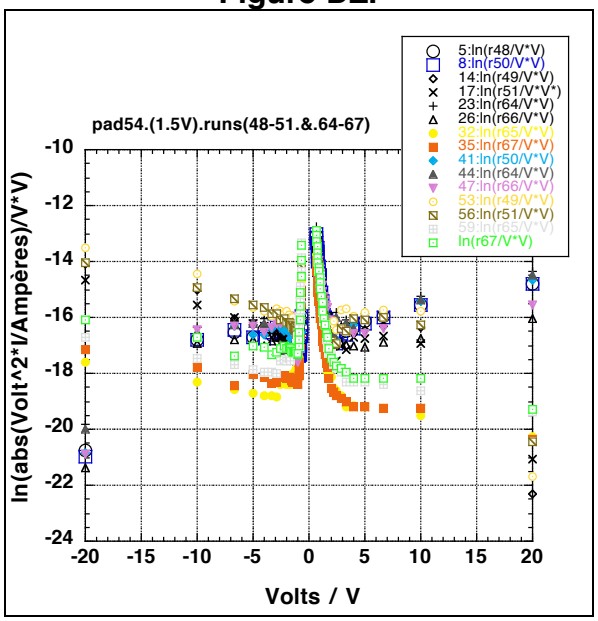

Figure EB.

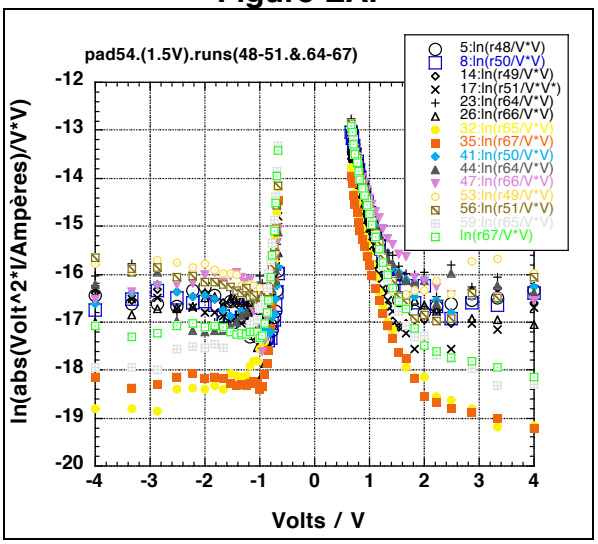

Figure EC.

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Pad 54 (2.0 Volts) runs (21-28 and 52-55 and 62-63)

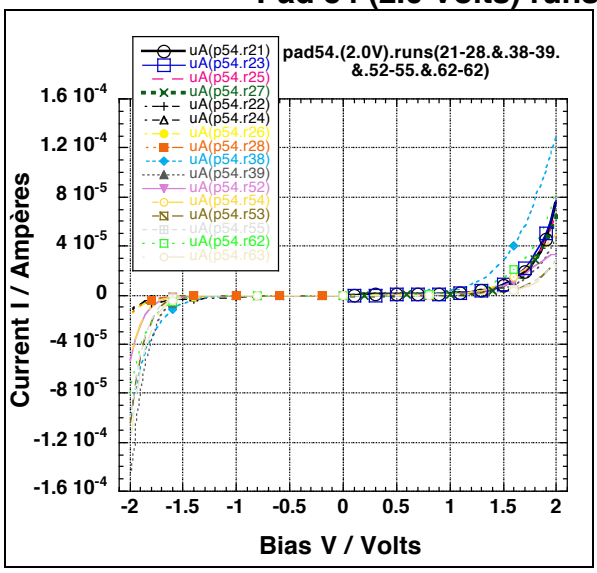

Figure ED.

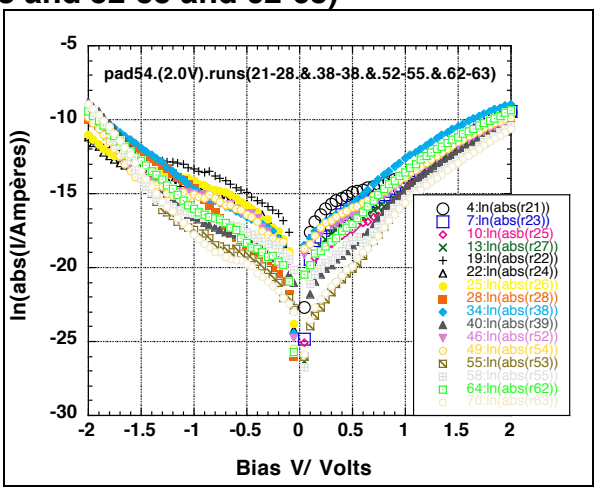

Figure EE.

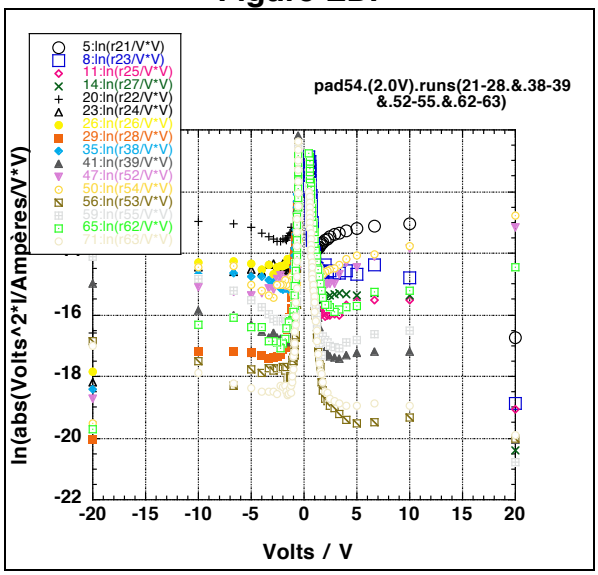

Figure EF.

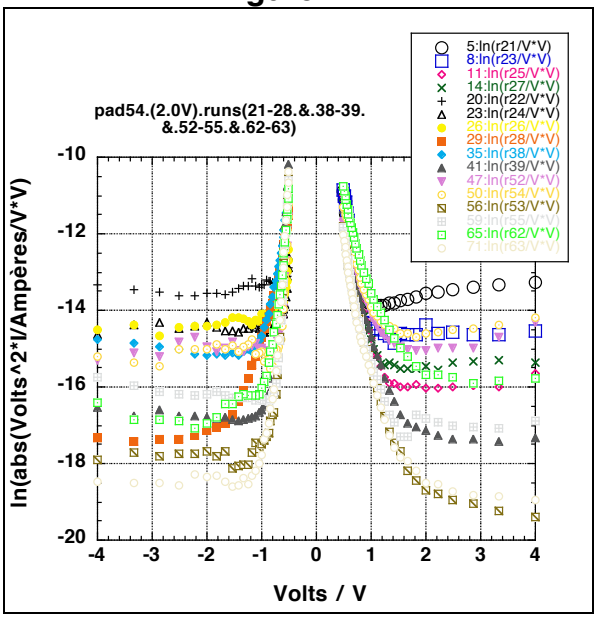

Figure EG.

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Pad 54 (2.5 Volts) runs (17-61)

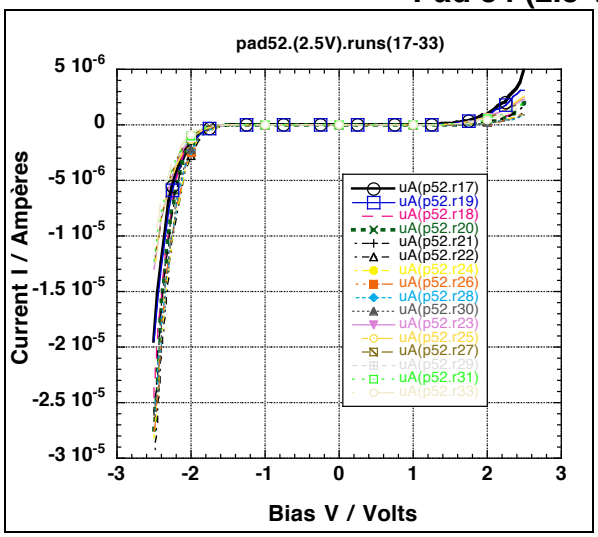

Figure EH.

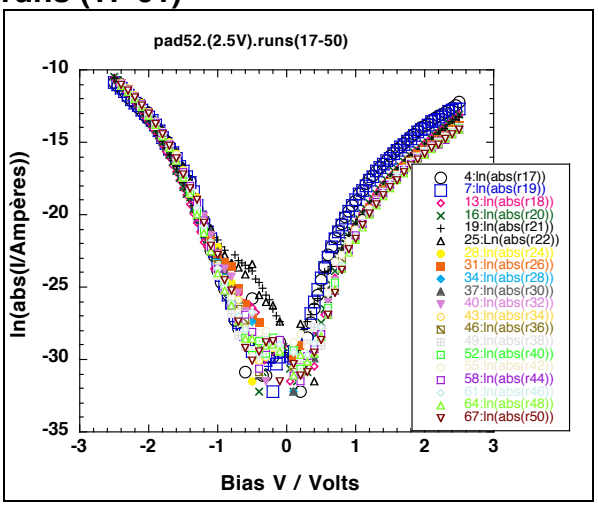

Figure EI.

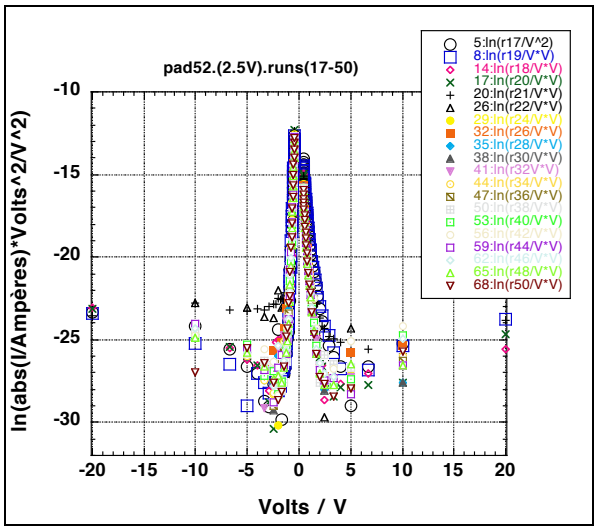

Figure EJ.

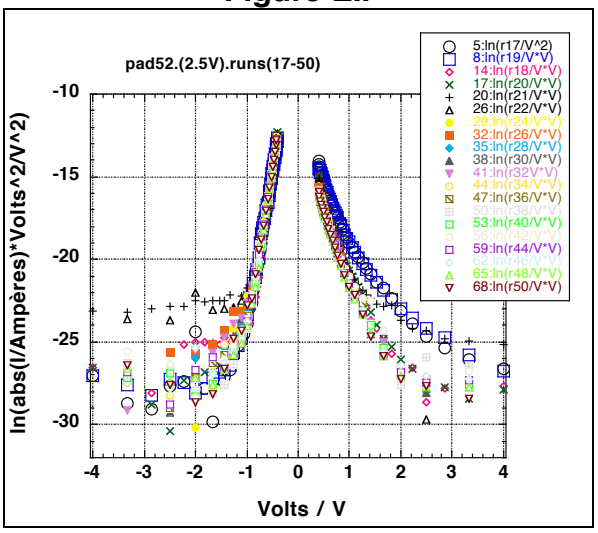

Figure EK.

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Pad 54 (2.5 Volts) runs (22-60) . even

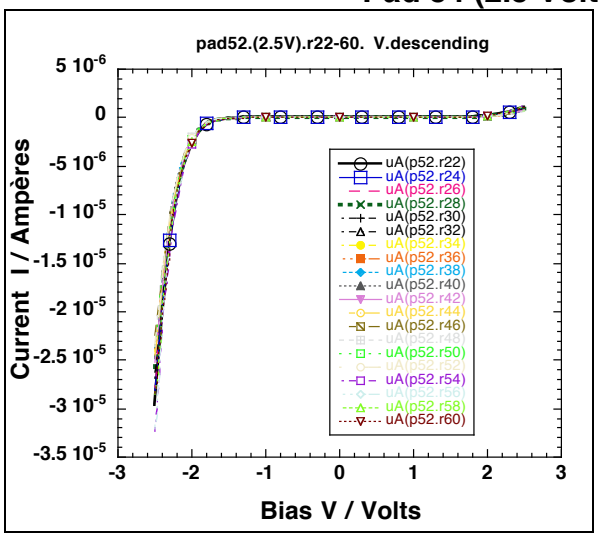

Figure EL.

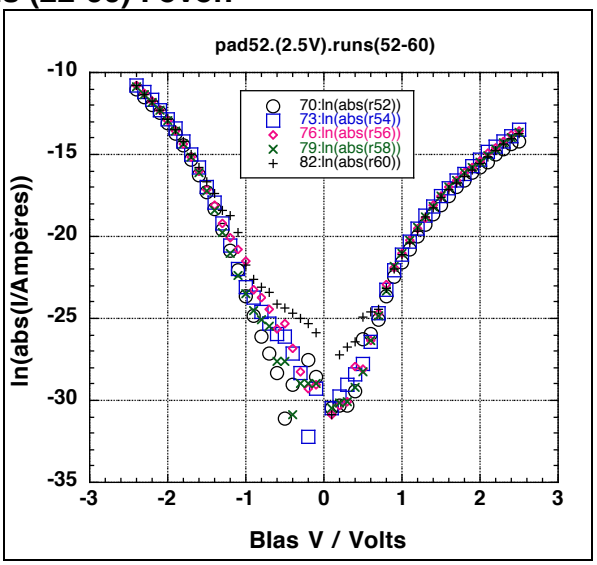

Figure EM.

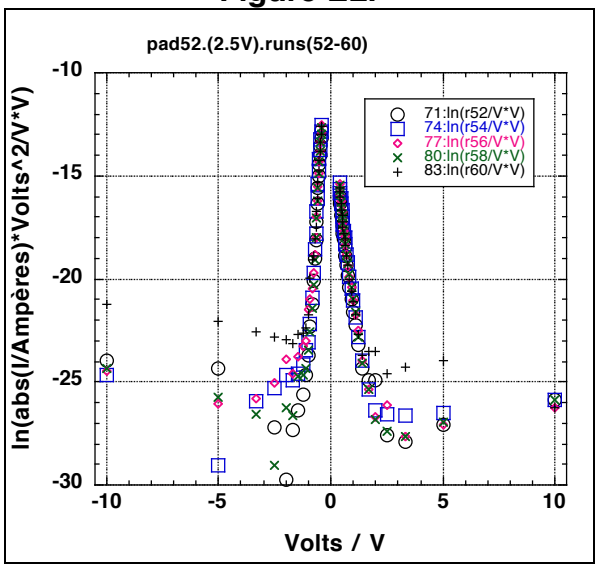

Figure EN.

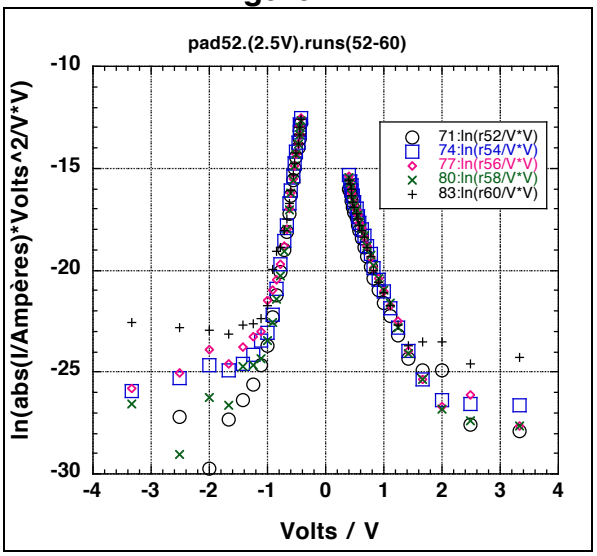

Figure EO.

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Pad 54 (2.5 Volts) runs (35-61).odd

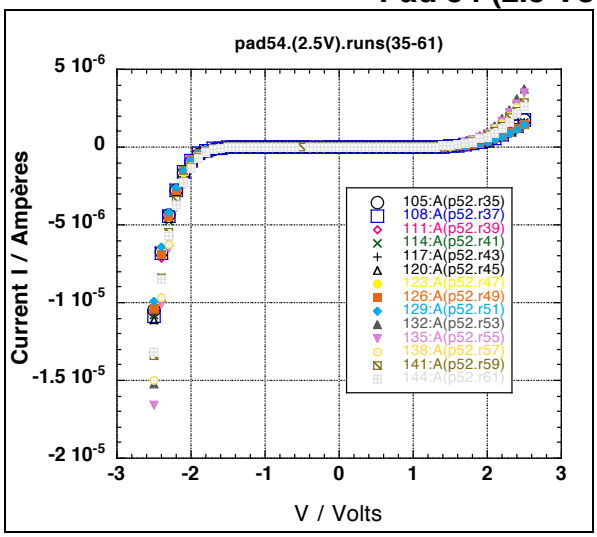


Figure EP.

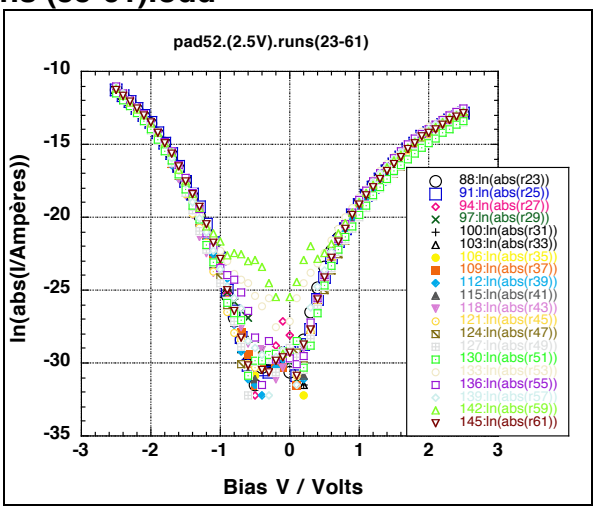


Figure EQ.

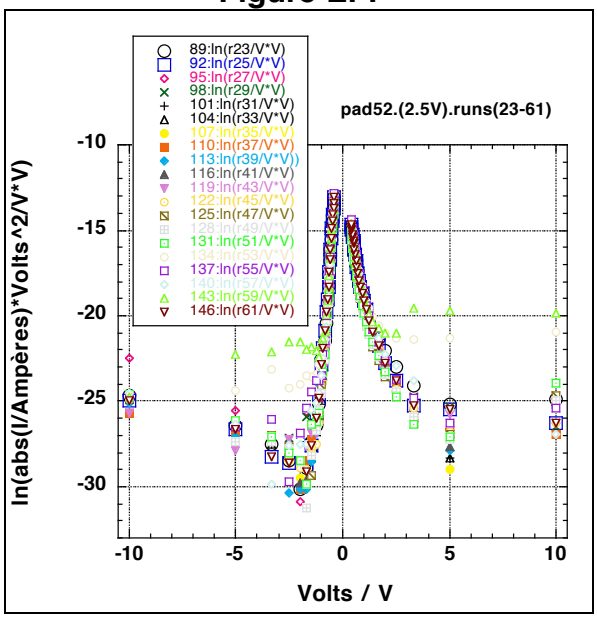


Figure ER.

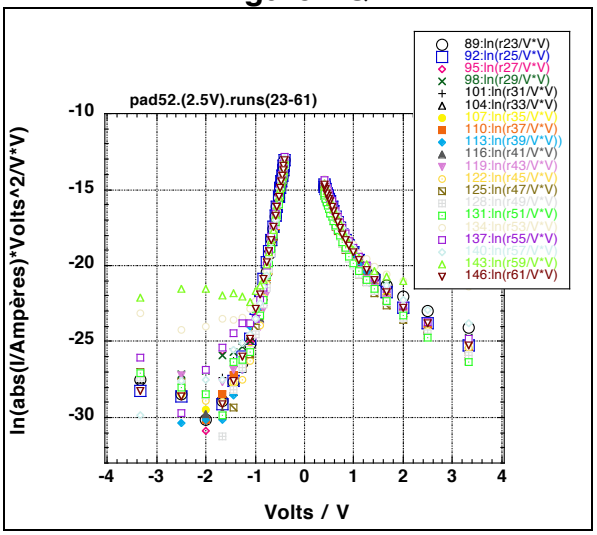
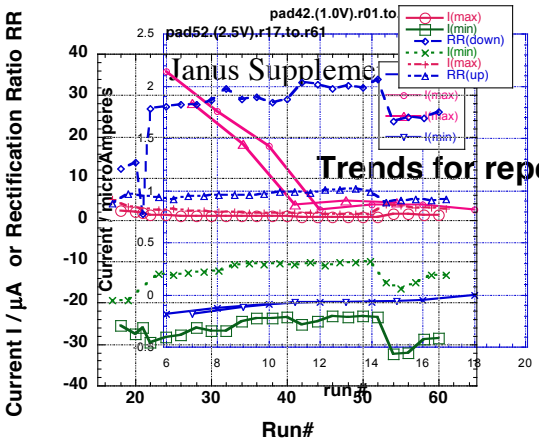


Figure ES.



Trends for repeated runs

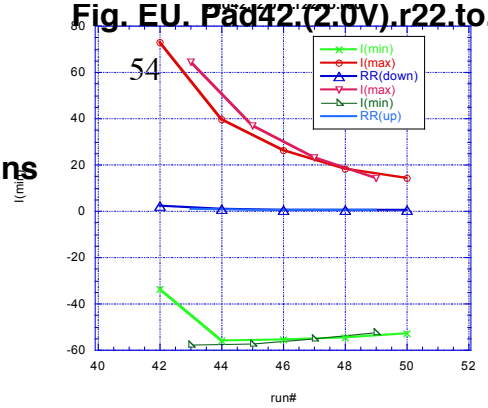


Fig. EU. Pad42.(2.0V).r22.to.60

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Fig.ET pad42.(1.0V).r01.to.r19

Fig.EV pad52.(2.5V).r01.to.r19