



Matrix Card Investigation - Engeenuity

Project #:	2079-01-A	Address:	9465 Counselors Row Suite 200
Date:	March 19, 2010		Indianapolis, IN 46240
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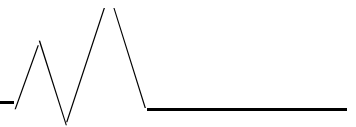
Project Goals

1. Determine the Matrix card effect on control stability
2. Determine the effect on solar collection with the 7.2 rev of the Matrix Card
3. Determine the pH effect of the 7.1 and 7.2 Matrix Cards

Experiment #1 – Control stability on Ion Chromatography Control Samples

The chemical instability of the Ion Chromatography controls even in a refrigerated condition is typically 48-52 hours. In this experiment we will mix four elements into a 100 ppb combined standard and measure it every 12 hours for three days then once a week for 5 weeks. The two variables we will assess are the control (not exposed to the DIGRIF108 7.1 matrix card) and the solution exposed to the bottom of the clear container for ½ hour before it was made up, then ½ hour each time it was tested (before testing) with only fluorescent lighting exposure.

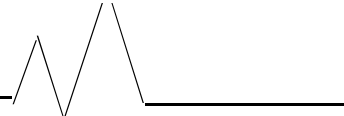
Sample ID	all values are in PPB Conditions	Ion Chromatography			
		Acetate	Formate	Chloride	Succinate
2079-01A-01	Blank DI water no exposure	0	0	0	0
2079-01A-02	Blank DI water with 7.1 card exposure 1/2 hour	0	0	0	0
	No Exposure Control				
2079-01A-03	Control Low #1 - Intial	100	101	100	99
2079-01A-04	Control Low #1 - 12 hour	100	100	100	99
2079-01A-05	Control Low #1 - 24 hour	99	100	100	98
2079-01A-06	Control Low #1 - 36 hour	96	97	100	95
2079-01A-07	Control Low #1 - 48 hour	89	90	99	89
2079-01A-08	Control Low #1 - 60 hour	73	62	99	51
2079-01A-09	Control Low #1 - 72 hour	41	40	99	23
2079-01A-10	Control Low #1 - 1 week (168 hours)	4	9	97	14
2079-01A-11	Control Low #1 - 2 week (336 hours)	3	8	97	10
2079-01A-12	Control Low #1 - 3 week (504 hours)	1	1	95	1
2079-01A-13	Control Low #1 - 4 week (672 hours)	1	1	94	1
2079-01A-14	Control Low #1 - 5 week (840 hours)	1	1	94	1
	Exposed to Matrix Card				
2079-01A-15	Control Low #1 - Intial	101	101	100	100
2079-01A-16	Control Low #1 - 12 hour	101	101	100	100
2079-01A-17	Control Low #1 - 24 hour	100	100	100	100
2079-01A-18	Control Low #1 - 36 hour	100	101	100	100
2079-01A-19	Control Low #1 - 48 hour	99	101	100	100
2079-01A-20	Control Low #1 - 60 hour	100	100	100	100
2079-01A-21	Control Low #1 - 72 hour	99	99	100	99
2079-01A-22	Control Low #1 - 1 week (168 hours)	99	99	100	98
2079-01A-23	Control Low #1 - 2 week (336 hours)	98	99	99	98
2079-01A-24	Control Low #1 - 3 week (504 hours)	97	98	98	97
2079-01A-25	Control Low #1 - 4 week (672 hours)	45	33	98	41
2079-01A-26	Control Low #1 - 5 week (840 hours)	37	25	98	23



Experiment #2 - Determine the effect on solar collection with the 7.2 rev of the Matrix Card

In this experiment we took four 7.2 rev Matrix Cards and placed them in a black box and taped sealed a 16% standard 2 ft x 3 ft solar panel with the cables sealed by duct tape connected to a multimeter (Fluke Multimeter). The multimeter measured the amount of Vdc output from the solar panel after the cards were exposed to 11:45 am one hour solar light on a clear day in a non filtered window. This experiment was repeated 10 times with the 4 cards and 10 times with no cards.

	all values are in Vdc	Fluke Multimeter in Dark Box
Sample ID	Conditions	
	No Card Exposure Control	
2079-01A-27	Blank Run #1	0.00
2079-01A-28	Blank Run #2	0.00
2079-01A-29	Blank Run #3	0.00
2079-01A-30	Blank Run #4	0.00
2079-01A-31	Blank Run #5	0.00
2079-01A-32	Blank Run #6	0.00
2079-01A-33	Blank Run #7	0.00
2079-01A-34	Blank Run #8	0.00
2079-01A-35	Blank Run #9	0.00
2079-01A-36	Blank Run #10	0.00
	Four Cards in Box after 1 hour exposure	
2079-01A-37	Run #1 (Exposure after 1 min to 7.2 cards)	0.02
2079-01A-38	Run #2 (Exposure after 1 min to 7.2 cards)	0.04
2079-01A-39	Run #3 (Exposure after 1 min to 7.2 cards)	0.03
2079-01A-40	Run #4 (Exposure after 1 min to 7.2 cards)	0.04
2079-01A-41	Run #5 (Exposure after 1 min to 7.2 cards)	0.01
2079-01A-42	Run #6 (Exposure after 1 min to 7.2 cards)	0.04
2079-01A-43	Run #7 (Exposure after 1 min to 7.2 cards)	0.04
2079-01A-44	Run #8 (Exposure after 1 min to 7.2 cards)	0.04
2079-01A-45	Run #9 (Exposure after 1 min to 7.2 cards)	0.03
2079-01A-46	Run #10 (Exposure after 1 min to 7.2 cards)	0.04



Experiment #3 - Determine the pH effect of the 7.1 and 7.2 Matrix Cards

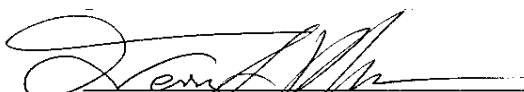
In this experiment we took pH readings with the 7.1 and 7.2 rev Matrix Cards and below the clear vials that were measured fresh DI water and then exposed to a card for 60 seconds then repeated 1 hour later with no additional card exposure

Sample ID	Conditions	all values are in Vdc		
		No Exposure		
		pH Meter	10 min	One hour
	No Card Exposure Control		Later	Later
2079-01A-47	DI water Run #1	7.81	5.11	5.01
2079-01A-28	DI water Run #2	7.80	5.23	5.09
2079-01A-29	DI water Run #3	7.84	4.98	4.87
2079-01A-30	DI water Run #4	7.81	5.44	5.31
2079-01A-31	DI water Run #5	7.89	5.27	5.07
2079-01A-32	DI water Run #6	7.80	5.39	5.3
2079-01A-33	DI water Run #7	7.77	4.97	4.85
2079-01A-34	DI water Run #8	7.80	5.87	5.72
2079-01A-35	DI water Run #9	7.75	4.98	4.79
2079-01A-36	DI water Run #10	7.75	5.22	5.03
				No additional exp
	Rev 7.2 exposure	No Exposure	60 Sec Exp	One hour
2079-01A-37	Run #1 (Exposure after 1 min to 7.2 cards)	7.82	8.11	8.24
2079-01A-38	Run #2 (Exposure after 1 min to 7.2 cards)	7.86	8.36	8.41
2079-01A-39	Run #3 (Exposure after 1 min to 7.2 cards)	7.88	8.52	8.55
2079-01A-40	Run #4 (Exposure after 1 min to 7.2 cards)	7.84	8.69	8.7
2079-01A-41	Run #5 (Exposure after 1 min to 7.2 cards)	7.84	8.71	8.72
2079-01A-42	Run #6 (Exposure after 1 min to 7.2 cards)	7.86	8.35	8.4
2079-01A-43	Run #7 (Exposure after 1 min to 7.2 cards)	7.89	8.72	8.75
2079-01A-44	Run #8 (Exposure after 1 min to 7.2 cards)	7.84	8.74	8.76
2079-01A-45	Run #9 (Exposure after 1 min to 7.2 cards)	7.87	8.39	8.44
2079-01A-46	Run #10 (Exposure after 1 min to 7.2 cards)	7.87	8.44	8.5

Conclusions

Experiment #1 shows chemical stability for a three week period when exposed to the 7.1 matrix cards before each test sample run. Experiment #2 shows that repeated measurements of the solar cell with the four cards in the dark box with the solar panel can produce 0.04 Vdc from the cards. Then Experiment #3 shows that the pH of the DI water stayed at 8.25 pH and even after one hour with no additional exposure to the cards. These experiments show that the Matrix cards are able to have positive effects on the conditions of the DI water and solar cells by a photonic output from the Matrix cards.

Reported by:



Terry Munson, President