Figure 1: Average maximum relative differential resistance responses, $\Delta R_{js,max}/R_{jb,air}$, of composite detector films consisting of carbon black and: **A)** Poly(ethylene-co-vinyl acetate), **B)** Poly(epichlorohydrin), when exposed to n-heptane, cyclohexanone, benzene, chloroform, nitrobenzene, and 2-propanol, each at $P/P° = 0.005$ to 0.03 in air in six even steps. Each analyte was presented 10 times to the array, with the order of presentation randomized over all repetitions of all test solvents. The error bars represent 1σ values computed from 10 exposures at each $P/P°$.

Figure 2: Histogram of the average normalized response of a 12-element array of carbon black-polymer detector films exposed to benzene presented 10 times at $P/P° = 0.005 - 0.03$ in air in six even steps. The data were normalized according to equation (1) in the text.

Figure 3: Maximum relative differential resistance responses, $\Delta R_{js,max}/R_{jb,air}$, of composite detector films consisting of carbon black and: **A)** poly(ethylene-co-vinyl acetate), **B)** poly(butadiene) when exposed to ethanol, 1-propanol, 1-butanol, 1-pentanol, 1-hexanol, and 1-heptanol each at $P/P° = 0.005$ to 0.03 in six even steps in air. Each analyte was presented 10 times to the array, with the order of presentation randomized over all repetitions of all test solvents. The error bars represent 1σ values computed from 10 exposures at each $P/P°$.

Figure 4: Maximum relative differential resistance responses, $\Delta R_{js,max}/R_{jb,air}$, of composite detector films consisting of carbon black and: **A)** poly(epichlorohydrin), when exposed to n-dodecane, n-decane, n-nonane, n-octane, n-heptane, and n-hexane each at $P/P° = 0.005$ to 0.03 in six even steps in air. **B)** Maximum relative differential resistance responses, $\Delta R_{js,max}/R_{jb,air}$, of a composite detector film consisting of carbon black and poly(ethylene oxide), when exposed to n-tetradecane, n-dodecane, n-decane, n-nonane, n-octane, and n-heptane each at $P/P° = 0.005$ to 0.03 in 27 even steps in air. Each analyte was presented 10 times to the array, with the order of

presentation randomized over all repetitions of all test solvents. The error bars represent 1σ values computed from 10 exposures at each $P/P°$.

Figure 5: Maximum relative differential resistance responses of a poly(caprolactone)-carbon black composite detector film when exposed to simultaneous and sequential binary mixtures of chloroform at $P/P° = 0.005, 0.01$, or 0.015, and methanol at $P/P° = 0.005, 0.01$, or 0.015. Each of the 9 binary mixture combinations was presented 5 times to the array, with the order of presentation randomized over all repetitions. The error bars represent 1σ values computed from 5 exposures at each $P/P°$.
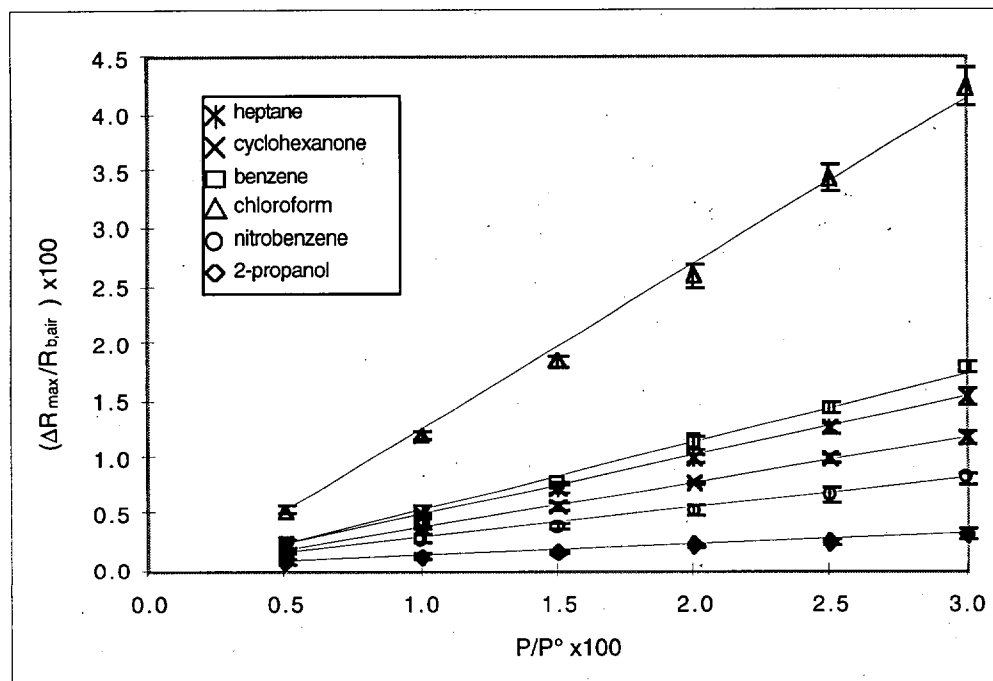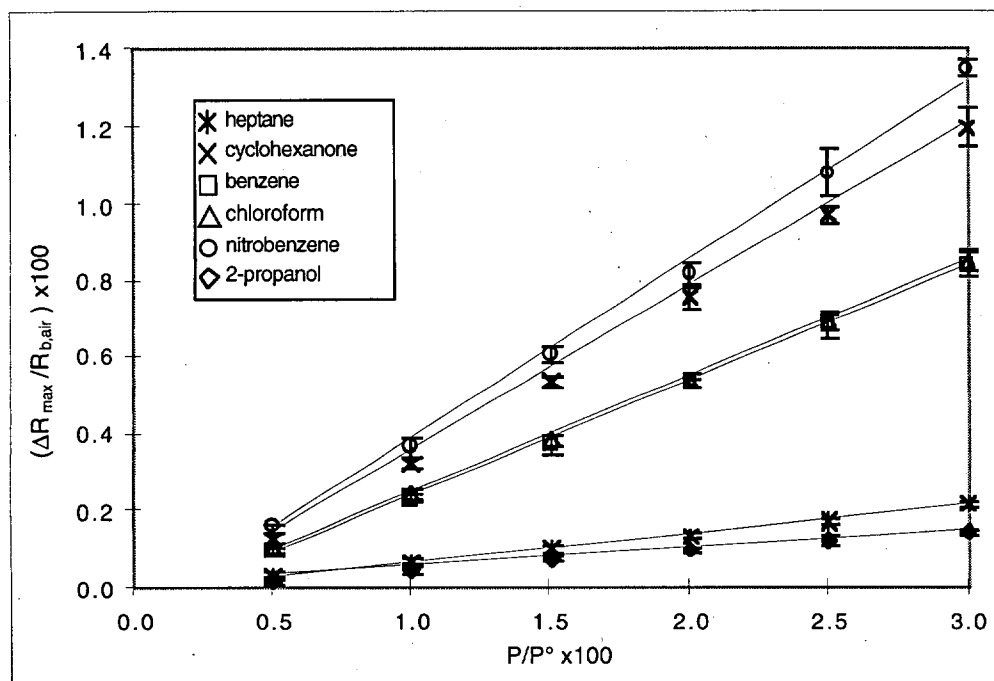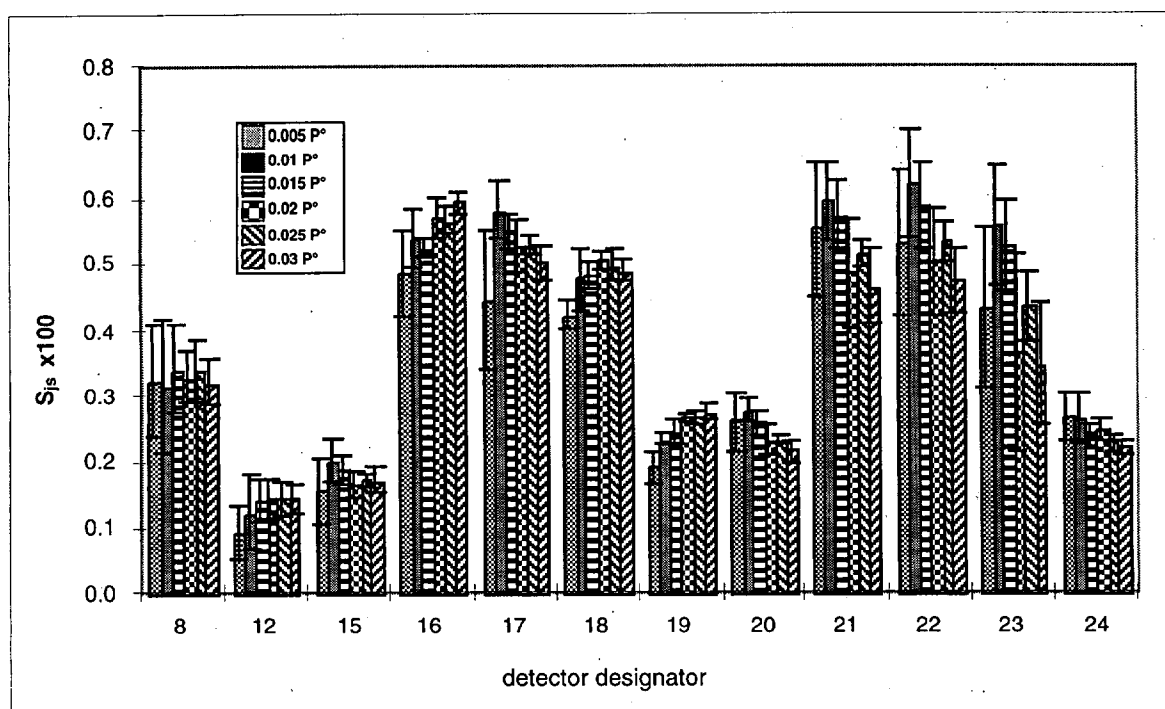
Figure 1a

Figure 1b

Figure 2
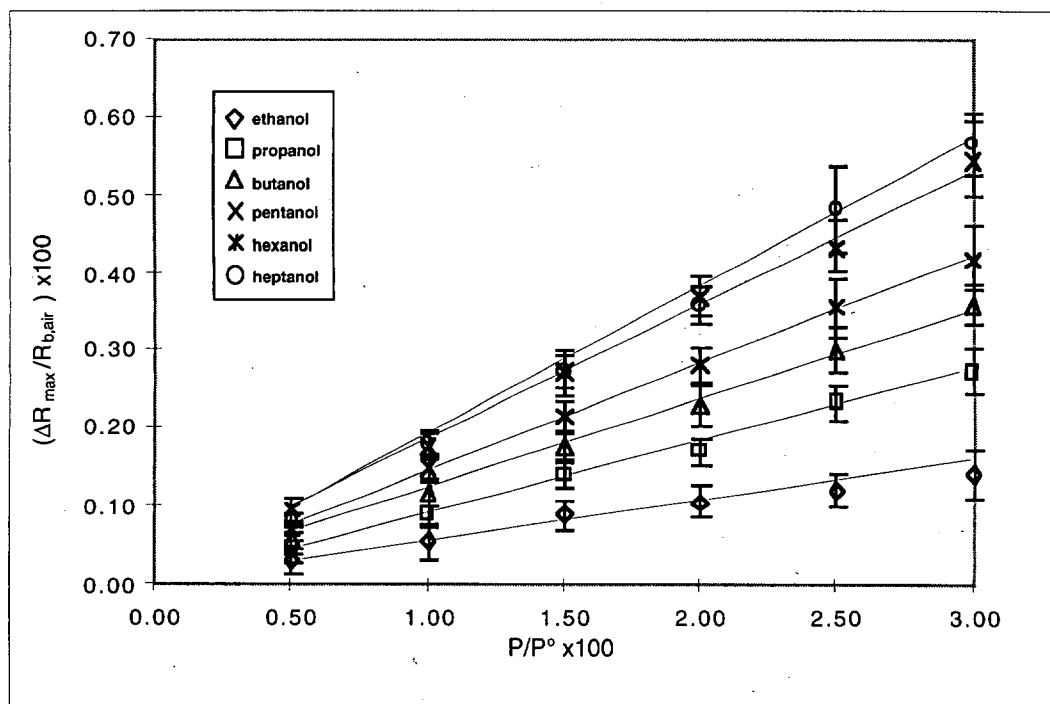
Figure 3a
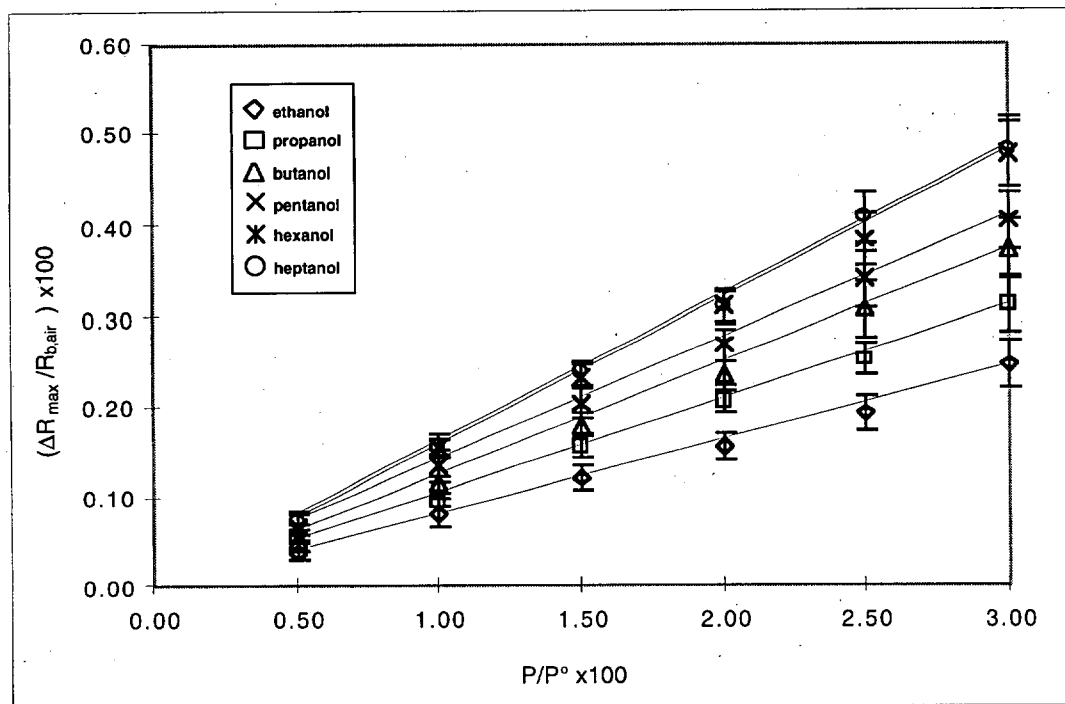
Figure 3b
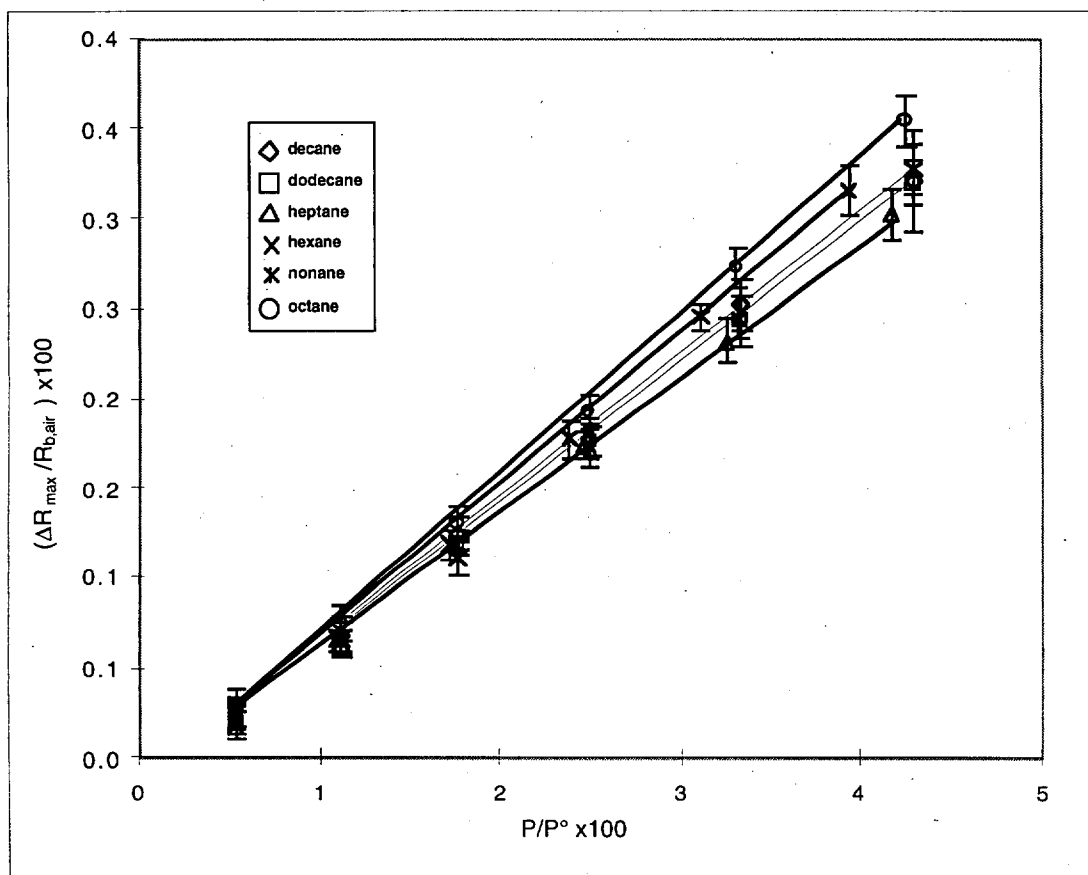
Figure 4a
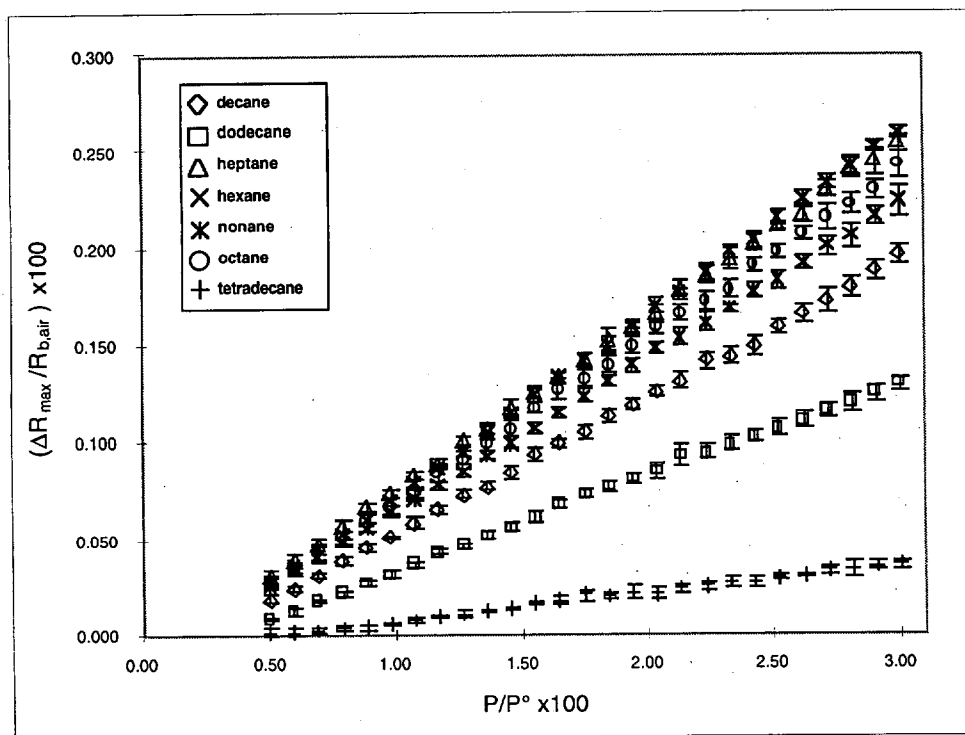
Figure 4b
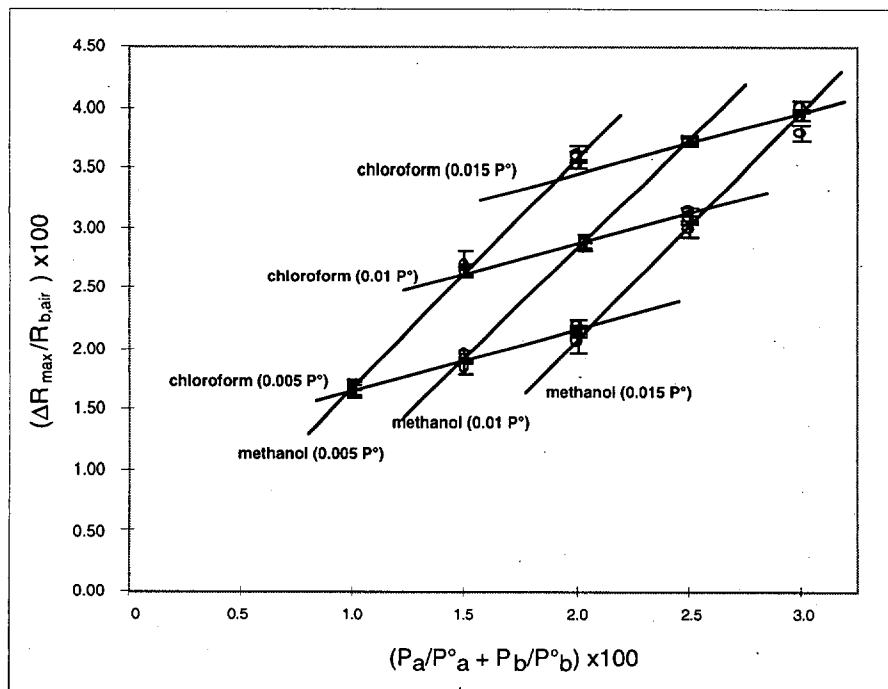
Figure 5

Detector designator ->		8	12	15	16	17	18	19	20	21	22	23	24
propanol	R^2	0.9952	0.9918	0.9896	0.9971	0.9942	0.9998	0.9997	0.9928	0.9554	0.9541	0.8924	0.9976
	intercept	-0.0459	-0.0291	-0.0129	0.0328	-0.0268	-0.0136	-0.0042	-0.0050	-0.0370	-0.0450	-0.0728	0.0025
	slope	0.0773	0.0589	0.0451	0.0945	0.1480	0.2200	0.0518	0.0428	0.0608	0.0829	0.1012	0.0567
	intercept error	0.0074	0.0074	0.0064	0.0070	0.0155	0.0044	0.0011	0.0050	0.0183	0.0253	0.0498	0.0038
	error in slope	0.0038	0.0038	0.0033	0.0036	0.0080	0.0023	0.0006	0.0026	0.0094	0.0130	0.0256	0.0020
benzene	R^2	0.9938	0.9964	0.9972	0.9989	0.9983	1.0000	0.9996	0.9969	0.9934	0.9900	0.9655	0.9986
	intercept	-0.0250	-0.0494	0.0057	-0.1032	0.0154	-0.0429	-0.0613	0.0453	0.1156	0.1159	0.1764	0.0365
	slope	0.3547	0.1767	0.1696	0.6225	0.5079	0.5017	0.2986	0.2030	0.4465	0.4615	0.3143	0.2075
	intercept error	0.0385	0.0147	0.0125	0.0288	0.0289	0.0047	0.0080	0.0156	0.0501	0.0640	0.0825	0.0108
	error in slope	0.0198	0.0075	0.0064	0.0148	0.0148	0.0024	0.0041	0.0080	0.0257	0.0329	0.0424	0.0056
chloroform	R^2	0.9998	0.9993	0.9982	0.9985	0.9994	0.9998	0.9997	0.9948	0.9944	0.9979	0.9762	0.9976
	intercept	-0.0160	-0.0192	-0.0188	-0.2922	0.0032	-0.0563	-0.0528	0.0233	0.0685	0.0712	0.0501	0.0358
	slope	0.7132	0.4158	0.2236	1.4889	1.0367	0.8509	0.2996	0.1905	0.4181	0.6415	0.3216	0.2268
	intercept error	0.0131	0.0156	0.0130	0.0784	0.0343	0.0157	0.0069	0.0190	0.0432	0.0407	0.0696	0.0154
	error in slope	0.0067	0.0080	0.0067	0.0403	0.0176	0.0081	0.0035	0.0098	0.0222	0.0209	0.0357	0.0079
cyclohexanone	R^2	0.6547	1.0000	0.9988	0.9999	0.9997	1.0000	0.9997	0.9989	0.9982	0.9987	0.9971	0.9992
	intercept	-0.0027	0.0000	-0.0315	-0.0226	-0.0449	-0.0668	-0.0933	0.0046	0.0714	-0.0623	0.0572	0.0082
	slope	0.0023	0.0000	0.1058	0.4025	0.3362	0.6128	0.4274	0.1681	0.3137	0.1384	0.3524	0.1907
	intercept error	0.0026	0.0000	0.0050	0.0044	0.0081	0.0059	0.0104	0.0078	0.0185	0.0069	0.0263	0.0073
	error in slope	0.0013	0.0000	0.0026	0.0022	0.0041	0.0030	0.0053	0.0040	0.0095	0.0035	0.0135	0.0037
n-heptane	R^2	0.7636	1.0000	0.9981	0.9998	0.9978	0.9993	0.9989	0.9984	0.9967	0.9926	0.9672	0.9988
	intercept	-0.0118	0.0000	-0.0037	-0.0332	0.0006	-0.0003	-0.0063	0.0344	0.2174	-0.0291	0.1391	0.0176
	slope	0.0105	0.0000	0.1006	0.5202	0.1333	0.1682	0.0739	0.1351	0.3387	0.1341	0.1779	0.1180
	intercept error	0.0087	0.0000	0.0061	0.0100	0.0087	0.0059	0.0033	0.0075	0.0267	0.0159	0.0455	0.0056
	error in slope	0.0044	0.0000	0.0031	0.0051	0.0045	0.0030	0.0017	0.0038	0.0137	0.0082	0.0234	0.0029
nitrobenzene	R^2	0.9890	0.9897	0.9965	0.9980	0.9969	0.9995	0.9987	0.9955	0.9958	0.9983	0.9942	0.9979
	intercept	-0.0470	-0.0421	0.0836	0.0190	0.2262	-0.0397	-0.0989	0.1199	0.1215	-0.0650	0.3104	0.0695
	slope	0.2957	0.1316	0.3439	0.2605	1.0431	0.5656	0.4738	0.3002	0.4776	0.3617	0.6262	0.2818
	intercept error	0.0431	0.0185	0.0282	0.0162	0.0802	0.0173	0.0238	0.0280	0.0429	0.0205	0.0659	0.0176
	error in slope	0.0221	0.0095	0.0145	0.0083	0.0412	0.0089	0.0122	0.0144	0.0220	0.0105	0.0338	0.0090
ethanol	R^2	0.9975	0.9961	0.9864	0.9894	0.9925	0.9980	0.9956	0.0120	0.9569	0.9859	0.9727	0.0897
	intercept	-0.0274	0.0037	0.0273	0.0140	0.0088	-0.0028	0.0024	0.0109	0.0014	0.0198	0.0005	0.0101
	slope	0.1168	0.1743	0.0290	0.0442	0.1528	0.0805	0.0367	0.0000	0.0417	0.0442	0.0586	0.0008
	intercept error	0.0081	0.0151	0.0047	0.0063	0.0184	0.0049	0.0033	0.0033	0.0123	0.0073	0.0136	0.0083
	error in slope	0.0042	0.0077	0.0024	0.0032	0.0094	0.0025	0.0017	0.0017	0.0063	0.0038	0.0070	0.0043
1-propanol	R^2	0.9967	0.9977	0.9840	0.9971	0.9919	0.9986	0.9990	0.9656	0.9903	0.9957	0.9929	0.8252
	intercept	-0.0080	0.0186	0.0003	-0.0020	-0.0014	-0.0046	-0.0048	0.0075	-0.0041	-0.0016	-0.0055	0.0124
	slope	0.1281	0.1536	0.0476	0.0918	0.1802	0.1045	0.0542	0.0111	0.0548	0.0426	0.0806	0.0080
	intercept error	0.0101	0.0102	0.0084	0.0069	0.0225	0.0054	0.0024	0.0029	0.0075	0.0038	0.0094	0.0053
	error in slope	0.0052	0.0052	0.0043	0.0035	0.0116	0.0028	0.0012	0.0015	0.0038	0.0020	0.0048	0.0027
1-butanol	R^2	0.9884	0.9909	0.9964	0.9991	0.9891	0.9995	0.9997	0.9900	0.9941	0.9436	0.9936	0.9858
	intercept	-0.0103	-0.0131	0.0170	-0.0038	-0.0192	-0.0155	-0.0031	0.0092	0.0186	0.0011	0.0447	0.0171
	slope	0.0891	0.0938	0.0559	0.1206	0.2091	0.1286	0.0629	0.0195	0.0652	0.0241	0.0936	0.0166
	intercept error	0.0133	0.0124	0.0046	0.0050	0.0303	0.0039	0.0015	0.0027	0.0069	0.0082	0.0104	0.0028
	error in slope	0.0068	0.0064	0.0024	0.0026	0.0156	0.0020	0.0008	0.0014	0.0036	0.0042	0.0053	0.0014
1-pentanol	R^2	0.9838	0.9818	0.9947	0.9997	0.9784	0.9999	0.9992	0.9968	0.9848	0.9597	0.9790	0.9888
	intercept	-0.0048	-0.0184	0.0028	0.0071	0.0384	-0.0021	-0.0060	0.0049	0.0189	0.0080	0.0630	0.0077
	slope	0.0535	0.0473	0.0770	0.1383	0.1986	0.1361	0.0670	0.0298	0.0823	0.0143	0.1038	0.0258
	intercept error	0.0095	0.0089	0.0077	0.0032	0.0409	0.0019	0.0026	0.0023	0.0141	0.0041	0.0211	0.0038
	error in slope	0.0049	0.0046	0.0040	0.0016	0.0210	0.0010	0.0013	0.0012	0.0073	0.0021	0.0108	0.0019
1-hexanol	R^2	0.9847	0.9042	0.9927	0.9986	0.9837	0.9995	0.9998	0.9995	0.9925	0.9623	0.9884	0.9716
	intercept	-0.0107	-0.0108	0.0128	0.0017	0.0427	-0.0100	-0.0036	0.0056	0.0163	0.0160	0.0674	0.0075
	slope	0.0298	0.0134	0.0909	0.1792	0.2403	0.1607	0.0703	0.0430	0.1037	0.0277	0.1097	0.0305
	intercept error	0.0051	0.0062	0.0108	0.0094	0.0428	0.0047	0.0015	0.0013	0.0124	0.0076	0.0164	0.0072
	error in slope	0.0026	0.0032	0.0055	0.0048	0.0220	0.0024	0.0008	0.0007	0.0064	0.0039	0.0084	0.0037
1-heptanol	R^2	0.9181	0.7070	0.9922	0.9990	0.9983	0.9994	0.9991	0.9973	0.9967	0.9639	0.9890	0.9934
	intercept	-0.0066	-0.0013	0.0191	-0.0182	0.0043	-0.0097	-0.0033	0.0088	-0.0072	0.0176	0.0294	0.0106
	slope	0.0123	0.0013	0.1028	0.1954	0.2732	0.1638	0.0691	0.0450	0.1073	0.0357	0.1102	0.0327
	intercept error	0.0052	0.0013	0.0126	0.0086	0.0156	0.0055	0.0028	0.0033	0.0086	0.0096	0.0161	0.0037
	error in slope	0.0027	0.0007	0.0065	0.0044	0.0080	0.0028	0.0014	0.0017	0.0044	0.0049	0.0082	0.0019
n-hexane	R^2	0.9986	0.9954	0.9968	0.9990	0.9856	0.9994	0.9999	0.9975	0.9920	0.9991	0.9859	0.9984
	intercept	-0.0101	-0.0065	-0.0276	-0.1162	-0.0362	-0.0344	-0.0262	-0.0057	0.0805	-0.0379	0.0567	-0.0033
	slope	0.0560	0.0262	0.1234	0.4980	0.1143	0.1788	0.0844	0.1214	0.4194	0.1647	0.1451	0.0961
	intercept error	0.0037	0.0031	0.0124	0.0279	0.0244	0.0074	0.0012	0.0107	0.0664	0.0085	0.0306	0.0067
	error in slope	0.0015	0.0013	0.0050	0.0112	0.0098	0.0030	0.0005	0.0043	0.0267	0.0034	0.0123	0.0027

n-heptane	R^2	0.9945	0.9541	0.9971	0.9997	0.8540	0.9999	0.9997	0.9912	0.9676	0.9983	0.9765	0.9972
	intercept	-0.0062	-0.0048	-0.0127	-0.1029	0.0991	-0.0175	-0.0133	0.0233	0.2930	-0.0296	0.0979	0.0080
	slope	0.0300	0.0110	0.0893	0.5117	0.0824	0.1659	0.0729	0.1123	0.3609	0.1109	0.1195	0.0946
	intercept error	0.0041	0.0045	0.0090	0.0177	0.0659	0.0037	0.0025	0.0197	0.1236	0.0085	0.0346	0.0093
	error in slope	0.0016	0.0017	0.0034	0.0067	0.0251	0.0014	0.0009	0.0075	0.0471	0.0032	0.0132	0.0035
n-octane	R^2	0.9953	0.8879	0.9944	0.9993	0.9931	0.9994	0.9998	0.9954	0.9952	0.9966	0.9975	0.9982
	intercept	-0.0106	-0.0013	0.0108	-0.0984	-0.0640	-0.0223	-0.0208	0.0424	0.4277	-0.0089	0.0644	0.0095
	slope	0.0153	0.0042	0.1353	0.5442	0.2374	0.1688	0.0847	0.1299	0.3384	0.0682	0.1188	0.1062
	intercept error	0.0020	0.0029	0.0192	0.0266	0.0373	0.0076	0.0025	0.0166	0.0445	0.0075	0.0113	0.0084
	error in slope	0.0007	0.0011	0.0072	0.0100	0.0140	0.0028	0.0009	0.0062	0.0167	0.0028	0.0042	0.0032
n-nonane	R^2	0.9478	0.8408	0.9952	0.9993	0.9930	0.9995	0.9996	0.9888	0.9474	0.9946	0.9826	0.9981
	intercept	-0.0057	-0.0015	-0.0029	-0.1037	-0.1515	-0.0294	-0.0208	0.0615	0.4170	0.0027	0.0396	0.0176
	slope	0.0052	0.0011	0.1340	0.5929	0.2444	0.1713	0.0773	0.1358	0.3227	0.0456	0.0911	0.1079
	intercept error	0.0023	0.0009	0.0177	0.0306	0.0389	0.0070	0.0030	0.0275	0.0545	0.0064	0.0230	0.0034
	error in slope	0.0009	0.0003	0.0066	0.0114	0.0145	0.0026	0.0011	0.0103	0.0545	0.0024	0.0086	0.0034
n-decane	R^2	0.8406	0.2328	0.9924	0.9979	0.9929	0.9988	0.9993	0.9912	0.9669	0.9854	0.9830	0.9966
	intercept	-0.0015	0.0004	0.0309	-0.1109	0.0117	-0.0162	-0.0143	0.0933	0.4940	-0.0115	-0.0025	0.0249
	slope	0.0019	0.0003	0.1459	0.6094	0.1745	0.1599	0.0756	0.1398	0.3153	0.0385	0.0830	0.1110
	intercept error	0.0016	0.0017	0.0244	0.0538	0.0282	0.0107	0.0038	0.0251	0.1119	0.0090	0.0208	0.0124
	error in slope	0.0006	0.0006	0.0091	0.0200	0.0105	0.0040	0.0014	0.0093	0.0416	0.0033	0.0077	0.0046
n-dodecane	R^2	0.7186	0.8800	0.9900	0.9999	0.9785	0.9997	1.0000	0.9820	0.9506	0.9491	0.9066	0.9934
	intercept	-0.0007	-0.0010	0.0877	-0.0894	0.0653	-0.0136	-0.0170	0.1451	0.3458	-0.0122	-0.0236	0.0384
	slope	0.0005	0.0008	0.1649	0.6296	0.1949	0.1478	0.0752	0.1474	0.2549	0.0109	0.0194	0.1148
	intercept error	0.0006	0.0006	0.0316	0.0120	0.0553	0.0048	0.0010	0.0381	0.1120	0.0049	0.0121	0.0179
	error in slope	0.0002	0.0002	0.0117	0.0045	0.0205	0.0018	0.0004	0.0142	0.0416	0.0018	0.0045	0.0067

Table 1: Correlation coefficients, intercepts, slopes, intercept errors, and errors in the slopes for three sets of analytes exposed at $P/P° = 0.005-0.03$.