Supplemental Information

Table S1. Weights of 35 single-material samples prepared directly on TGA pans (no filter).

Sample	Clean Coal (μg)	Sample	Shale (μg)	Sample	Rock dust (μg)
1	49	13	56	24	51
2	50	14	61	25	58
3	70	15	62	26	80
4	77	16	79	27	115
5	83	17	108	28	135
6	100	18	158	29	146
7	123	19	187	30	318
8	133	20	246	31	371
9	152	21	267	32	457
10	216	22	312	33	496
11	327	23	411	34	649
12	598			35	783

Table S2. Mass of each source material in 16 composite dust samples prepared directly on TGA pans (no filter).

Sample	Clean Coal (μg)	Shale (μg)	Rock Dust (μg)	Total Dust Mass (μg)
1	51	0	56	107
2	74	0	92	166
3	72	77	57	206
4	72	180	0	252
5	0	138	121	259
6	0	222	46	268
7	36	175	68	279
8	48	0	257	305
9	152	0	155	307
10	103	105	131	339
11	299	0	80	379
12	241	59	81	381
13	311	0	70	381
14	265	0	188	453
15	122	139	279	540
16	238	252	223	713

Table S3. Mass of 31 single-material sample masses prepared on PC filters, along with the dust recovery from each sample.

Clean Coal		Shale		Rock Dust	
Sample	Mass (μg)	Sample	Mass (μg)	Sample	Mass (μg)
1	139	1	84	1	92
2	163	2	90	2	174
3	192	3	153	3	182
4	236	4	173	4	228
5	270	5	198	5	228
6	311	6	201	6	230
7	328	7	242	7	294
8	360	8	274	8	352
9	425	9	283	9	377
10	507	10	333	10	437
		11	360		

Table S4. Mass of each source material in 36 composite samples prepared on PC filters, along with the dust recovery from each sample filter.

Sample	Clean Coal (μg)	Shale (μg)	Rock Dust (μg)	Total Dust Mass (μg)	Recovery to TGA Pan
1	48	0	47	95	84%
2	31	65	0	96	117%
3	47	83	0	130	95%
4	107	34	0	141	96%
5	70	75	0	145	118%
6	0	71	89	160	90%
7	91	0	88	179	93%
8	30	99	59	188	90%
9	39	150	35	224	88%
10	0	183	61	244	84%
11	73	0	172	245	83%
12	135	51	68	254	119%
13	76	77	121	274	100%
14	38	72	166	276	77%
15	0	152	166	318	119%
16	98	137	97	332	99%
17	95	113	136	344	85%
18	131	123	95	349	94%
19	142	79	131	352	94%
20	139	86	135	360	104%
21	103	267	0	370	98%
22	0	200	177	377	91%
23	50	236	121	407	118%
24	68	0	348	416	99%
25	73	249	121	443	95%
26	0	264	213	477	107%
27	285	307	0	592	95%
28	0	300	348	648	96%
29	328	332	0	660	96%
30	142	408	260	810	99%
31	487	0	334	821	103%
32	516	0	407	923	103%
33	0	451	489	940	103%
34	0	621	333	954	94%
35	428	321	324	1073	101%
36	354	507	458	1319	100%

Table S5. Observed and expected masses of coal, carbonate (CB) and non-carbonate (NCB) minerals for the 36 composite dust samples prepared on PC filters, along with error between observed and expected percentages for each component.

Sample	Observed Mass (µg)			Expected Mass (µg)			Error % (Observed%-Expected%)		
	Coal	NCB	CB	Coal	NCB	CB	Coal	NCB	CB
1	39	0	45	46	6	43	-2%	-6%	8%
2	50	59	4	34	59	3	9%	-9%	1%
3	48	63	13	50	76	4	0%	-8%	8%
4	94	32	10	105	35	2	-5%	-1%	6%
5	88	73	10	72	70	4	2%	-5%	4%
6	4	62	78	4	71	85	0%	-2%	1%
7	88	5	75	87	11	81	4%	-3%	-1%
8	27	87	57	35	94	59	-3%	1%	2%
9	39	118	41	46	138	40	-1%	-2%	3%
10	11	131	64	11	168	65	0%	-5%	5%
11	90	12	100	70	18	157	16%	-1%	-15%
12	161	72	69	133	57	65	1%	1%	-3%
13	84	78	112	78	82	115	2%	-1%	-1%
14	24	43	146	41	80	155	-4%	-9%	13%
15	82	136	160	9	149	159	19%	-11%	-8%
16	114	115	100	102	134	96	4%	-5%	2%
17	98	111	120	98	116	130	1%	0%	-1%
18	89	111	97	133	123	93	-8%	2%	6%
19	124	84	125	141	87	124	-3%	0%	3%
20	127	85	126	139	94	128	-1%	-1%	2%
21	122	230	34	115	242	13	0%	-6%	6%
22	11	205	152	12	193	172	0%	4%	-4%
23	75	186	110	62	222	122	5%	-5%	0%
24	148	21	324	65	32	318	14%	-4%	-11%
25	85	223	129	85	235	123	0%	-2%	2%
26	18	223	214	16	253	208	0%	-4%	4%
27	308	297	26	292	285	15	-1%	-1%	2%
28	18	261	336	18	297	333	0%	-3%	3%
29	327	280	27	335	309	17	1%	-3%	2%
30	157	380	266	161	391	258	0%	-1%	1%
31	472	47	324	468	48	306	-1%	0%	1%
32	485	72	392	495	55	372	-3%	2%	1%
33	27	387	469	27	443	470	0%	-3%	3%
34	43	555	366	37	581	336	0%	-3%	3%
35	420	314	337	430	330	312	-1%	-1%	2%
36	367	488	466	370	504	444	0%	-1%	2%

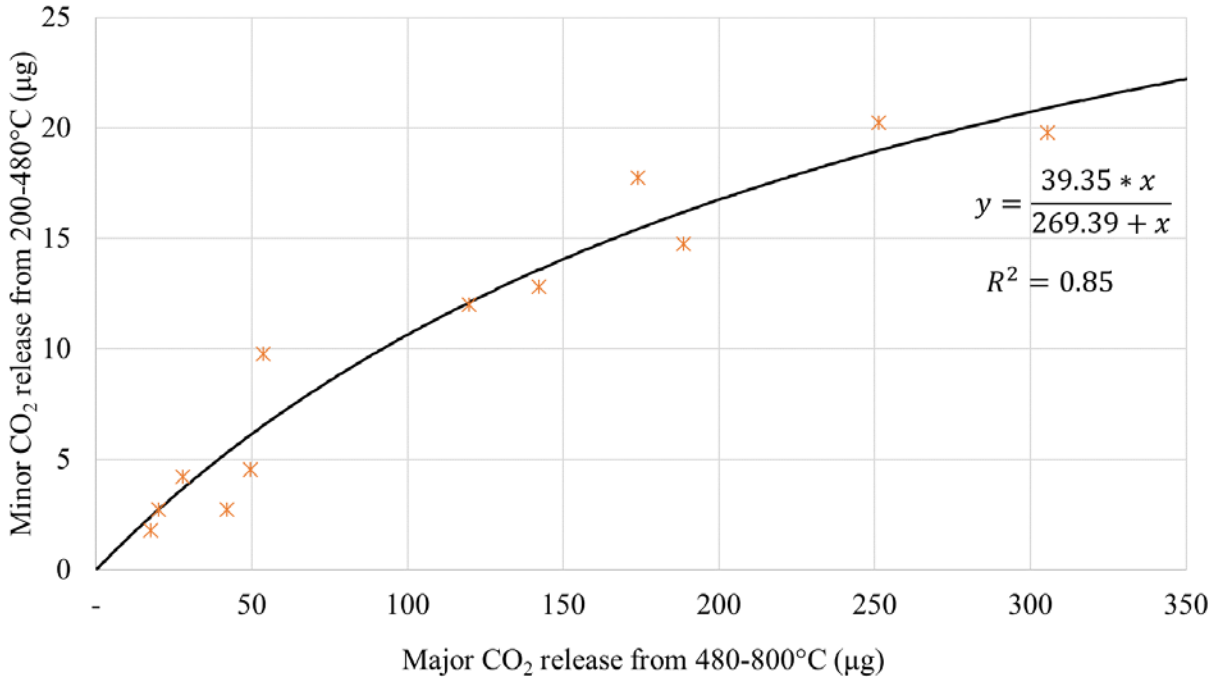

Figure S1. Minor CO_2 release ($M_{CO_{2(1)}}$) in the 200-480 °C range as a function of the major CO_2 release ($M_{CO_{2(2)}}$) in the 480-800°C range for the 12 rock dust samples shown in Table S1. The data was observed to follow a Langmuir-type relationship.

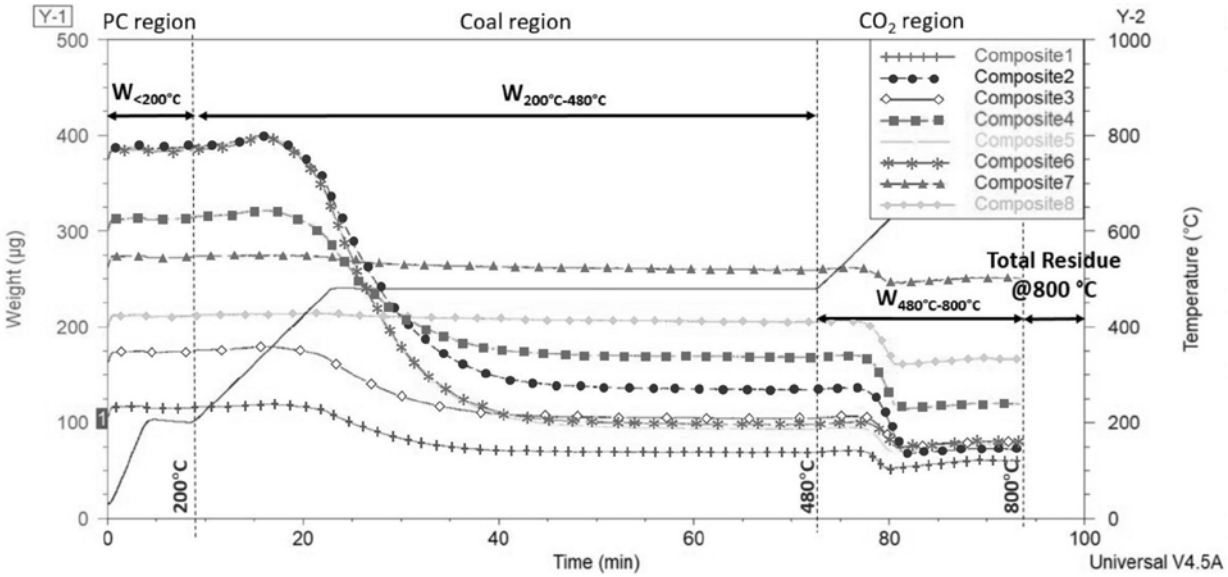

Figure S2. Example thermograms (not drift-corrected) for eight of the 16 composite dust samples shown in Table S2, prepared directly on the TGA pan (no filter).

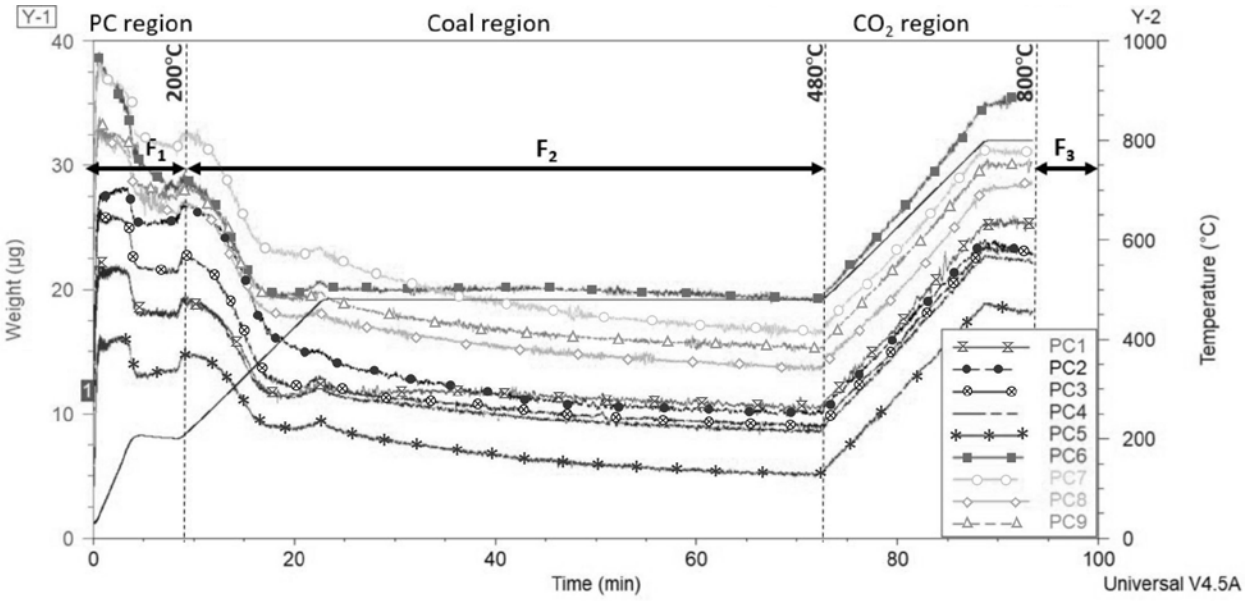

Figure S3. Example thermograms (not drift-corrected) for nine of the 24 blank PC filters.

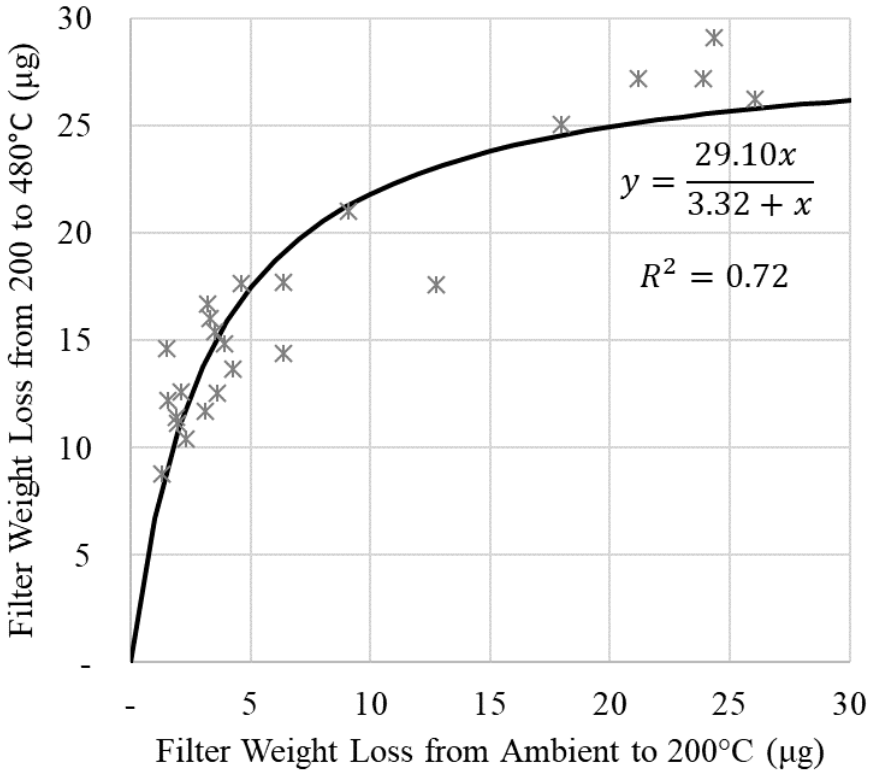

Figure S4. Secondary filter residue weight loss (M_{F_2}) in the 200-480 °C range as a function of initial weight loss (M_{F_1}) in the ambient-200°C range for the 24 blank PC filter samples analyzed. The data was observed to follow a Langmuir-type relationship.

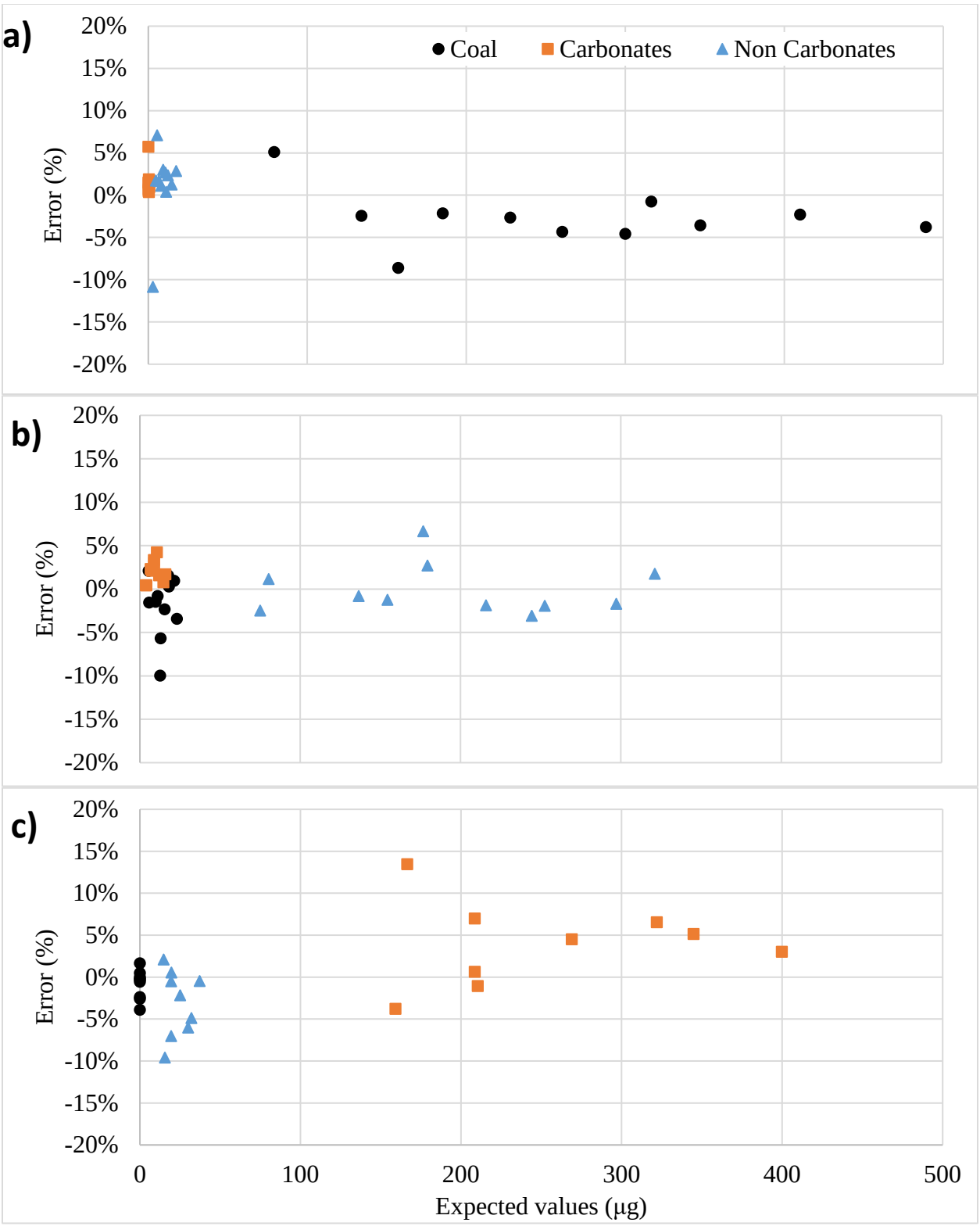

Figure S5. Error between observed and expected percentages of coal, carbonate and non-carbonate minerals for 31 single-material samples prepared on PC filters with a) clean coal (N=10), b) shale (N=11) and c) rock dust (N=10). The expected values (µg) for each component are computed from mass of each dust material included in a given sample and the material composition (per Table 3).

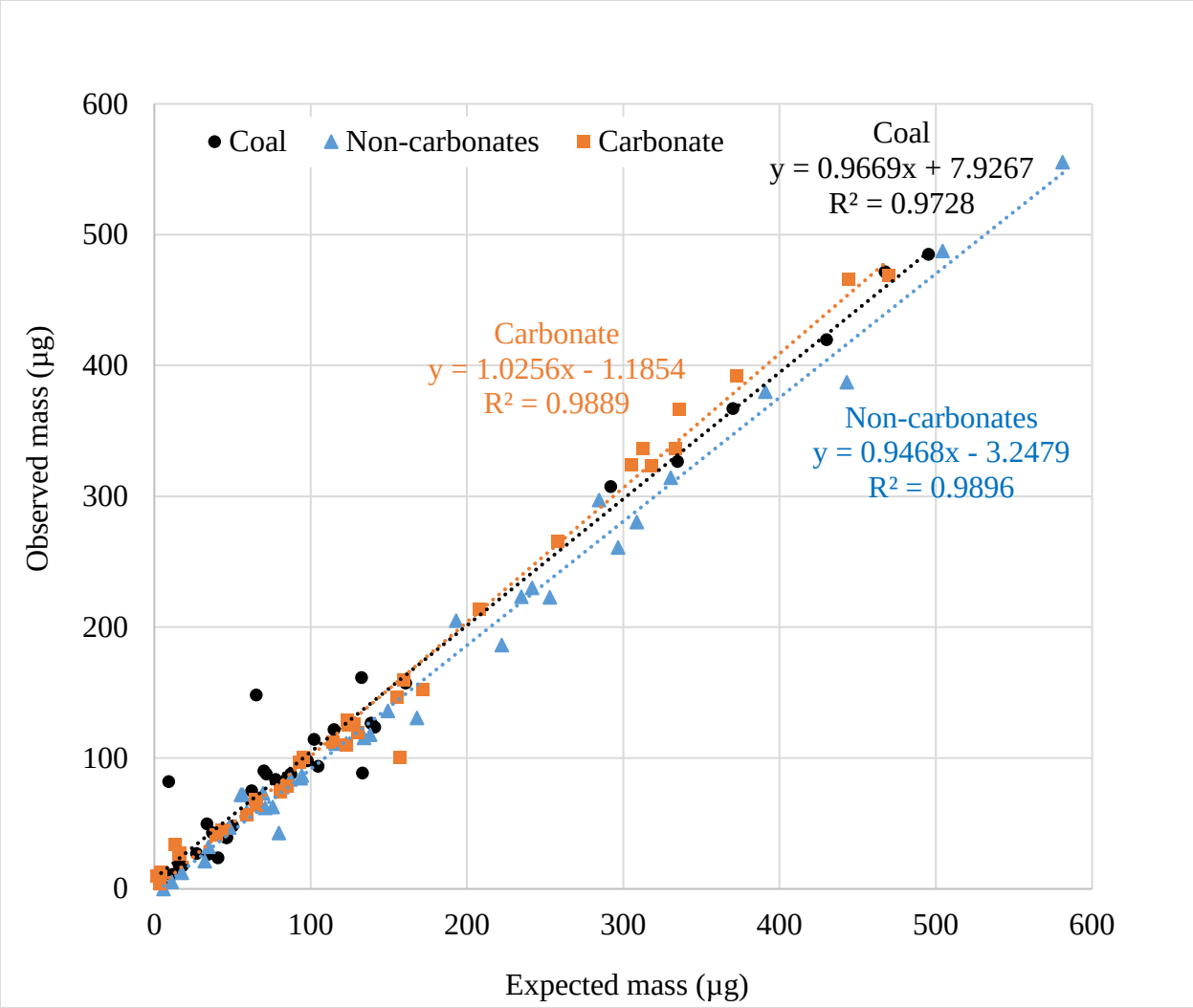

Figure S6. Observed versus expected masses of coal, carbonate and non-carbonate minerals for 36 composite dust samples prepared on PC filters.