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B. H. O'Connor and J. M. Jaklevic

January 1980

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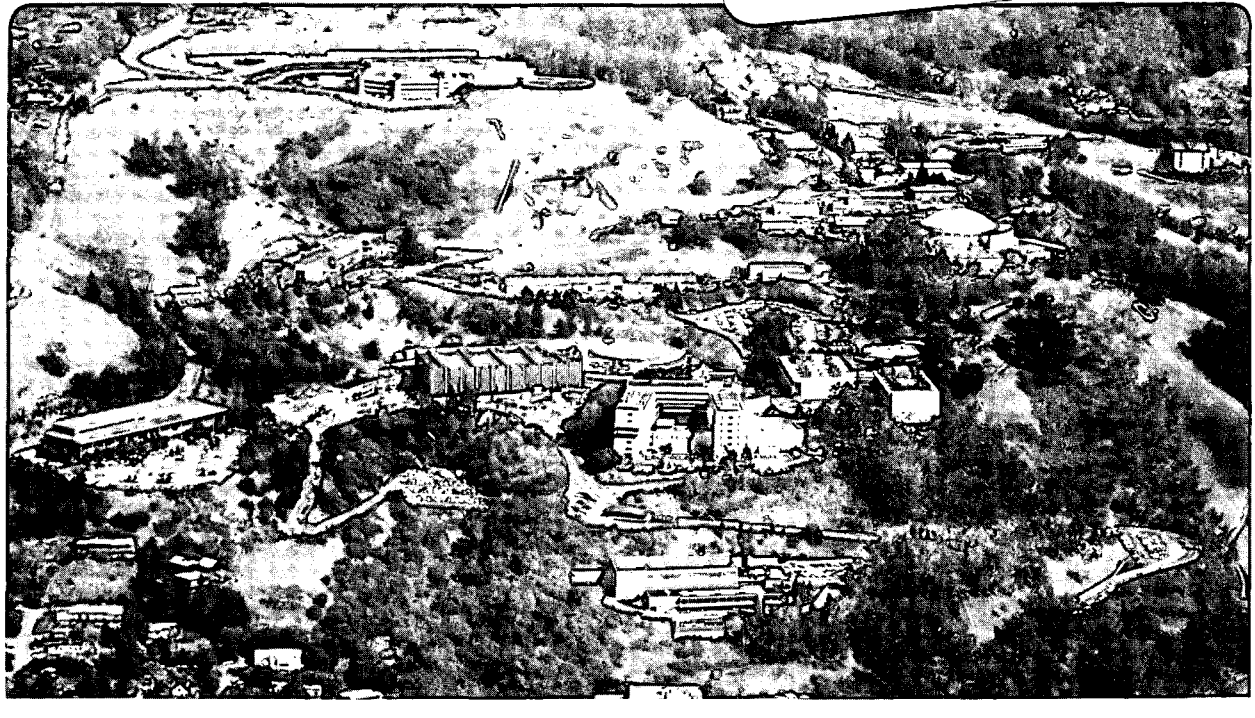

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X-RAY POWDER DIFFRACTION PATTERNS FOR ST. LOUIS AEROSOL SAMPLES*

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The purpose of this report is to present the diffraction pattern data measured in a x-ray powder diffraction study of airborne particulate material which had been collected in the St. Louis area on cellulose ester membrane filters (O'Connor and Jaklevic; 1979a, 1979b).

The St. Louis filter samples were collected with dichotomous samplers operated continuously at 50 l/min over periods of 6 or 12 hours, and producing fine (<2.4 μm mass median diameter) and course (2.4-20 μm) particle deposits on 1.2 μm pore size cellulose ester membrane filters (Millipore*** type RAWP) of effective diameter 32 mm and mass/area = 4 mg/cm^2. The samples were from stations 103 and 105 (inner city sites), 118 (transitional) and 124 (outer), along a line running in a southerly direction from the city. Details of the sample collection conditions and mass loadings are given in O'Connor and Jaklevic (1979b).

The powder diffractograms were acquired with a conventional Norelco Bragg-Brentano diffractometer, and with a Cu anode x-ray tube operated at 40kV and 20mA and monochromatized with a 8.4 μm Ni filter. The intensity of the diffracted beam was measured with a Xe side-window proportional counter and the detector arm was stepped in increments of 0.04° in 2θ(2xBragg angle) from 10° to 50°. A 1° divergence slit was employed with a matching antiscatter slit and a 0.05° receiving slit. The total time for each scan was 23 hours.

The patterns were reduced by manual means to sets of peak positions (2θ in degrees) and relative intensity above background (INT). The line data are given in Tables 1 and 2, together with the Bragg spacing (D in Angstrom units) and the uncertainty in the spacing (ERR-D).

The reduced data were subsequently analyzed by the search/match identification system operated by the Interactive Sciences Corporation through the Telenet computer network (see O'Connor and Jaklevic, 1979b). Figures 1 and 2 give the powder diffraction patterns in bar graph form and the line assignments for the selected compounds.

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REFERENCES

O'Connor, B.H. and Jaklevic, J.M. (1979a) X-ray diffractometry of airborne particulates deposited on membrane filters. Lawrence Berkeley Laboratory -- Report LBL-9041.

O'Connor, B.H. and Jaklevic, J.M. (1979b). Chemical analysis of ambient aerosol samples by x-ray powder diffractometry. Lawrence Berkeley Laboratory -- Report LBL-9496.

Table 1a. Diffraction Data for Station 103 Fine Fraction Samples

SAMPLE I/D : 58771

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	10.03	8.816	.050	3.0
2	11.76	7.526	.037	4.0
3	12.16	7.277	.034	15.0
4	14.00	6.324	.026	5.0
5	14.87	5.959	.023	3.0
6	18.20	4.873	.015	2.5
7	18.78	4.725	.014	3.0
8	20.10	4.417	.013	5.0
9	20.33	4.367	.012	8.0
10	20.56	4.319	.012	10.0
11	21.31	4.169	.011	6.0
12	22.92	3.879	.010	2.0
13	23.56	3.777	.009	3.0
14	27.70	3.220	.007	8.0
15	28.51	3.131	.006	3.0
16	29.31	3.047	.006	6.0
17	29.83	2.995	.006	2.0
18	32.02	2.795	.005	5.0
19	34.49	2.600	.004	4.0
20	38.92	2.314	.003	1.5
21	40.82	2.210	.003	2.0

SAMPLE I/D : 67268

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.09	7.321	.052	14.0
2	16.65	5.324	.027	5.5
3	16.99	5.217	.026	19.5
4	20.26	4.382	.018	33.5
5	20.52	4.328	.018	42.0
6	22.85	3.892	.014	22.5
7	27.06	3.295	.010	5.5
8	27.66	3.224	.010	8.5
9	28.52	3.129	.009	17.0
10	29.30	3.048	.009	17.0
11	29.82	2.997	.008	8.5
12	32.05	2.792	.007	3.0
13	33.69	2.660	.007	5.5
14	34.29	2.615	.006	2.0
15	35.67	2.517	.006	5.5
16	38.76	2.323	.005	7.0
17	41.09	2.197	.004	3.0
18	41.60	2.171	.004	2.0

SAMPLE I/D : 71102

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.20	7.255	.047	20.5
2	18.76	4.730	.020	3.5
3	20.08	4.422	.017	9.0
4	24.76	3.596	.011	2.0
5	27.56	3.236	.009	11.0
6	32.04	2.793	.007	4.5
7	34.36	2.610	.006	4.5
8	40.84	2.210	.004	2.5
9	42.80	2.113	.004	2.0
10	45.80	1.981	.003	1.0

SAMPLE I/D : 73464

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.20	7.255	.047	5.0
2	16.92	5.240	.025	5.0
3	20.20	4.396	.017	15.0
4	20.48	4.336	.017	27.0
5	21.32	4.167	.015	3.0
6	22.84	3.893	.013	6.5
7	23.56	3.776	.013	3.0
8	27.48	3.246	.009	2.0
9	28.48	3.134	.009	6.0
10	29.28	3.050	.008	9.0
11	29.84	2.994	.008	4.0
12	32.08	2.790	.007	1.0
13	33.72	2.658	.006	1.0
14	34.28	2.616	.006	1.5
15	35.48	2.530	.006	1.0
16	38.76	2.323	.005	1.5

SAMPLE I/D : 67765

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.08	7.326	.048	3.5
2	20.20	4.396	.017	2.5
3	27.52	3.241	.009	1.5
4	34.20	2.622	.006	1.0

SAMPLE I/D : 69476

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.16	7.278	.048	27.0
2	16.68	5.315	.025	4.0
3	16.96	5.228	.024	7.5
4	20.12	4.413	.017	15.0
5	20.48	4.336	.017	30.0
6	22.80	3.900	.014	9.0
7	27.52	3.241	.009	10.5
8	28.48	3.134	.009	4.5
9	29.24	3.054	.008	7.5
10	29.80	2.998	.008	6.0
11	32.00	2.797	.007	5.0
12	34.40	2.607	.006	5.0
13	35.60	2.522	.005	2.0
14	38.84	2.319	.005	3.0
15	40.80	2.212	.004	2.0
16	41.68	2.167	.004	1.5
17	42.80	2.113	.004	1.5
18	45.88	1.978	.003	1.0

Table 16. Diffraction Data for Station 105 Fine Fraction Samples

SAMPLE I/D : 53652

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.05	7.346	.044	6.0
2	16.71	5.305	.023	8.0
3	17.00	5.214	.022	17.0
4	18.75	4.732	.018	2.0
5	20.21	4.393	.016	40.0
6	20.58	4.316	.015	62.0
7	22.91	3.882	.012	24.0
8	28.45	3.137	.008	12.0
9	28.60	3.122	.008	11.0
10	29.25	3.053	.007	24.0
11	29.83	2.995	.007	15.0
12	32.02	2.795	.006	2.0
13	33.12	2.705	.006	3.0
14	33.70	2.660	.006	6.0
15	34.35	2.610	.005	3.0
16	35.52	2.527	.005	5.0
17	38.80	2.321	.004	7.0
18	41.06	2.198	.004	3.0
19	41.57	2.172	.004	4.0

SAMPLE I/D : 58832

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.10	7.312	.035	12.5
2	16.98	5.222	.018	3.0
3	18.76	4.731	.014	2.5
4	20.25	4.386	.012	9.5
5	20.53	4.325	.012	15.5
6	21.28	4.175	.011	5.0
7	22.89	3.886	.010	5.0
8	27.59	3.233	.007	4.0
9	28.45	3.137	.006	3.5
10	29.31	3.047	.006	5.0
11	29.83	2.996	.006	2.5
12	31.89	2.806	.005	2.5
13	33.72	2.658	.004	1.5
14	34.36	2.610	.004	2.0
15	40.66	2.219	.003	1.5
16	40.89	2.207	.003	1.5
17	41.58	2.172	.003	2.0

SAMPLE I/D : 67105

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	16.96	5.228	.018	9.0
2	20.23	4.390	.012	31.0
3	20.57	4.317	.012	44.0
4	22.87	3.889	.010	18.0
5	28.49	3.133	.006	10.0
6	28.60	3.121	.006	7.0
7	29.29	3.049	.006	15.0
8	29.75	3.003	.006	8.0
9	33.70	2.659	.004	3.0
10	34.34	2.612	.004	2.0
11	35.60	2.522	.004	5.0
12	38.75	2.324	.003	4.0
13	41.05	2.199	.003	3.0
14	41.56	2.173	.003	4.0

SAMPLE I/D : 69762

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.08	7.328	.035	42.0
2	18.50	4.796	.015	4.5
3	18.62	4.766	.015	5.5
4	19.99	4.441	.013	27.0
5	20.39	4.355	.012	13.0
6	21.20	4.191	.011	2.0
7	22.75	3.909	.010	3.0
8	27.45	3.249	.007	18.5
9	28.37	3.146	.006	3.5
10	29.23	3.056	.006	4.5
11	29.68	3.009	.006	2.0
12	30.26	2.954	.005	2.0
13	30.77	2.905	.005	1.5
14	31.86	2.808	.005	9.5
15	33.13	2.704	.005	3.0
16	34.22	2.621	.004	11.0
17	35.48	2.530	.004	1.5
18	37.08	2.424	.004	2.0
19	38.00	2.368	.003	1.5
20	38.57	2.334	.003	2.0
21	40.64	2.220	.003	5.5
22	41.44	2.179	.003	2.0
23	42.59	2.123	.003	3.0
24	45.57	1.991	.002	3.0
25	49.58	1.838	.002	1.5
26	50.16	1.819	.002	2.5

Table 1c. Diffraction Data for Station 118 Fine Fraction Samples

SAMPLE I/D : 58309

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.20	7.255	.034	9.0
2	16.67	5.317	.018	3.0
3	16.96	5.228	.018	6.0
4	20.23	4.390	.012	14.0
5	20.51	4.329	.012	19.0
6	22.87	3.889	.010	5.0
7	27.57	3.235	.007	5.0
8	28.43	3.139	.006	4.0
9	29.29	3.049	.006	8.0
10	29.81	2.998	.006	5.0
11	31.93	2.803	.005	3.0
12	33.65	2.664	.004	2.0
13	34.34	2.612	.004	3.0
14	35.60	2.522	.004	2.0
15	38.69	2.327	.003	2.0
16	40.87	2.208	.003	2.0

SAMPLE I/D : 65720

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.07	7.333	.035	5.0
2	16.71	5.304	.018	3.0
3	16.94	5.233	.018	2.0
4	20.27	4.381	.012	8.0
5	20.50	4.332	.012	12.0
6	22.91	3.882	.010	3.0
7	26.64	3.347	.007	2.0
8	27.50	3.244	.007	4.0
9	28.41	3.141	.006	4.0
10	29.27	3.051	.006	5.0
11	29.79	2.999	.006	5.0
12	31.91	2.804	.005	2.0
13	33.17	2.700	.005	2.0
14	33.69	2.660	.004	2.0
15	34.32	2.613	.004	3.0
16	35.64	2.519	.004	2.0
17	38.79	2.321	.003	2.0
18	41.60	2.171	.003	2.0
19	43.67	2.073	.003	2.0
20	44.47	2.037	.002	2.0

SAMPLE I/D : 66930

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	11.63	7.609	.052	6.5
2	16.15	5.488	.027	6.5
3	17.87	4.963	.022	48.0
4	19.11	4.644	.019	14.5
5	20.23	4.389	.017	2.0
6	20.71	4.289	.016	8.0
7	23.35	3.810	.013	12.5
8	23.55	3.778	.013	16.0
9	25.05	3.555	.011	3.0
10	26.27	3.392	.010	29.5
11	26.63	3.347	.010	16.5
12	29.15	3.063	.008	3.0
13	30.51	2.930	.008	16.0
14	32.91	2.722	.006	2.0
15	33.35	2.687	.006	2.0
16	35.67	2.517	.005	3.5
17	36.39	2.469	.005	3.0
18	40.47	2.229	.004	3.0
19	40.87	2.208	.004	3.0

SAMPLE I/D : 66933

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.08	7.327	.035	5.0
2	16.67	5.319	.018	12.0
3	17.01	5.212	.017	17.0
4	17.93	4.947	.016	11.0
5	19.08	4.652	.014	2.0
6	20.28	4.379	.012	47.0
7	20.51	4.330	.012	58.0
8	20.97	4.237	.011	10.0
9	22.92	3.880	.010	15.0
10	23.61	3.769	.009	7.0
11	26.47	3.367	.007	50.0
12	28.48	3.134	.006	12.0
13	28.65	3.115	.006	5.0
14	29.34	3.044	.006	21.0
15	29.86	2.992	.006	11.0
16	30.55	2.927	.005	4.0
17	32.15	2.784	.005	3.0
18	32.95	2.718	.005	3.0
19	33.70	2.659	.004	9.0
20	34.39	2.608	.004	3.0
21	35.65	2.518	.004	6.0
22	37.77	2.382	.003	3.0
23	38.80	2.321	.003	6.0
24	41.04	2.199	.003	3.0
25	41.61	2.170	.003	5.0
26	42.53	2.125	.003	5.0

Table 1c-cont. Diffraction Data for Station 118 Fine Fraction Samples

SAMPLE I/D : 69707

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	11.89	7.445	.045	4.0
2	16.19	5.475	.024	7.0
3	17.94	4.945	.020	54.0
4	18.59	4.772	.019	2.5
5	19.10	4.646	.018	17.5
6	23.33	3.812	.012	9.5
7	23.62	3.766	.011	31.0
8	26.32	3.386	.009	50.0
9	26.61	3.349	.009	16.0
10	30.48	2.933	.007	23.0
11	32.96	2.718	.006	5.0
12	35.58	2.523	.005	5.0
13	36.24	2.479	.005	5.0
14	40.39	2.233	.004	4.5
15	40.90	2.206	.004	5.0

SAMPLE I/D : 70472

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.15	7.284	.048	3.0
2	16.87	5.255	.025	4.5
3	20.19	4.398	.017	13.0
4	20.51	4.330	.017	19.5
5	22.79	3.902	.014	7.0
6	28.43	3.139	.009	3.0
7	29.27	3.051	.008	6.0
8	29.79	2.999	.008	3.0
9	33.15	2.702	.006	1.5
10	33.71	2.659	.006	2.0
11	34.35	2.611	.006	1.5
12	35.55	2.525	.005	2.0
13	38.79	2.321	.005	2.0

Table 1d. Diffraction Data for Station 124 Fine Fraction Samples

SAMPLE I/D : 58022

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.14	7.289	.048	3.0
2	16.67	5.317	.025	6.0
3	16.96	5.228	.024	11.0
4	20.28	4.378	.017	25.0
5	20.52	4.329	.017	38.0
6	22.75	3.908	.014	12.0
7	28.49	3.133	.009	8.0
8	28.60	3.121	.009	6.0
9	29.29	3.049	.008	14.0
10	29.80	2.998	.008	10.0
11	33.71	2.659	.006	4.0
12	35.60	2.522	.005	2.0
13	38.75	2.324	.005	4.0
14	41.56	2.173	.004	3.0

SAMPLE I/D : 58604

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.31	7.188	.033	8.0
2	20.23	4.390	.012	5.0
3	20.92	4.247	.012	7.0
4	22.98	3.870	.010	2.0
5	23.44	3.795	.009	4.0
6	26.77	3.331	.007	6.0
7	27.68	3.222	.007	10.0
8	29.75	3.003	.006	6.0
9	32.16	2.784	.005	4.0
10	33.19	2.699	.005	4.0
11	34.22	2.620	.004	3.0
12	37.09	2.424	.004	2.0
13	43.74	2.069	.003	5.0
14	44.54	2.034	.002	4.0
15	45.81	1.981	.002	2.0

SAMPLE I/D : 62226

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.21	7.251	.034	5.0
2	26.66	3.344	.007	3.0
3	27.69	3.221	.007	5.0
4	29.76	3.002	.006	3.0
5	32.28	2.773	.005	2.0
6	33.31	2.690	.004	2.0
7	43.75	2.069	.003	2.0

SAMPLE I/D : 67353

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.10	7.315	.048	4.0
2	17.89	4.958	.022	16.0
3	19.09	4.648	.019	6.0
4	23.62	3.766	.013	11.0
5	26.32	3.386	.010	14.0
6	26.61	3.350	.010	7.0
7	30.51	2.930	.008	6.0
8	35.61	2.521	.005	2.0
9	36.30	2.475	.005	2.0
10	40.32	2.237	.004	2.0
11	40.77	2.213	.004	2.0

SAMPLE I/D : 67355

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	12.02	7.362	.044	2.0
2	17.92	4.949	.020	15.0
3	19.16	4.632	.017	5.0
4	23.53	3.781	.012	18.0
5	26.23	3.398	.009	15.0
6	26.59	3.352	.009	9.0
7	30.38	2.942	.007	7.0
8	32.86	2.726	.006	2.0
9	35.62	2.520	.005	2.0
10	40.72	2.216	.004	2.0

SAMPLE I/D : 69276

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	16.16	5.486	.019	7.0
2	17.82	4.976	.016	42.0
3	19.09	4.649	.014	15.0
4	20.47	4.338	.012	6.0
5	23.58	3.773	.009	33.0
6	26.28	3.391	.007	36.0
7	26.57	3.354	.007	16.0
8	30.49	2.932	.005	20.0
9	32.90	2.722	.005	3.0
10	35.66	2.517	.004	5.0
11	36.30	2.475	.004	3.0
12	38.77	2.322	.003	2.0
13	40.38	2.233	.003	2.0
14	40.90	2.206	.003	3.0
15	43.43	2.083	.003	1.0
16	48.15	1.890	.002	2.0

Table 2a. Diffraction Data for Station 103 Coarse Fraction Samples

SAMPLE I/D : 17268

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	11.62	7.615	.052	3.0
2	18.90	4.695	.020	4.0
3	20.62	4.307	.017	3.0
4	22.90	3.883	.013	2.0
5	23.66	3.760	.013	5.0
6	26.46	3.368	.010	6.0
7	26.66	3.344	.010	13.0
8	27.38	3.257	.009	2.0
9	28.06	3.180	.009	4.0
10	29.14	3.064	.008	4.0
11	29.42	3.036	.008	14.0
12	30.90	2.894	.007	2.0
13	31.62	2.830	.007	2.0
14	39.42	2.286	.004	2.0
15	47.54	1.913	.003	2.0
16	48.58	1.874	.003	2.0

SAMPLE I/D : 17765

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	16.83	5.268	.025	8.0
2	18.23	4.866	.021	3.0
3	19.39	4.578	.019	4.0
4	20.91	4.248	.016	5.0
5	23.71	3.753	.012	17.0
6	25.47	3.497	.011	6.0
7	26.63	3.347	.010	10.0
8	29.43	3.035	.008	13.0
9	31.35	2.853	.007	2.0
10	37.99	2.368	.005	1.5
11	39.35	2.290	.004	2.0
12	43.23	2.093	.004	2.0
13	45.35	2.000	.003	3.0

SAMPLE I/D : 19476

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	26.66	3.344	.010	16.5
2	29.42	3.036	.008	6.0
3	31.18	2.868	.007	1.5
4	35.54	2.526	.006	1.5

SAMPLE I/D : 20518

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	20.72	4.287	.016	3.0
2	26.66	3.343	.010	28.0
3	29.43	3.035	.008	20.0
4	30.81	2.902	.007	5.0
5	35.89	2.502	.005	2.0
6	36.42	2.467	.005	1.0
7	37.54	2.396	.005	1.0
8	39.34	2.290	.004	5.0
9	43.22	2.093	.004	4.0
10	47.63	1.909	.003	2.0

SAMPLE I/D : 20533

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	16.44	5.393	.028	3.0
2	20.31	4.373	.018	9.0
3	20.48	4.336	.018	14.0
4	22.72	3.914	.015	6.0
5	23.67	3.760	.013	4.0
6	25.35	3.513	.012	3.0
7	26.50	3.363	.011	9.5
8	28.57	3.124	.009	5.0
9	29.26	3.052	.009	7.0
10	29.69	3.009	.009	2.0
11	29.95	2.984	.008	4.0
12	30.81	2.902	.008	1.5
13	33.04	2.711	.007	1.0
14	34.08	2.631	.006	1.0
15	35.63	2.520	.006	2.5
16	39.15	2.301	.005	1.5
17	41.82	2.160	.004	.5
18	43.03	2.102	.004	1.0

SAMPLE I/D : 21102

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	20.64	4.303	.016	3.0
2	21.74	4.087	.015	1.0
3	23.02	3.863	.013	3.0
4	14.52	6.100	.036	1.0
5	26.67	3.342	.010	12.0
6	29.40	3.038	.008	19.0
7	30.92	2.892	.007	2.0
8	32.88	2.724	.006	2.0
9	35.57	2.524	.005	1.0
10	39.36	2.289	.004	3.0
11	43.22	2.093	.004	3.0
12	47.53	1.913	.003	2.0
13	48.58	1.874	.003	2.0

Table 2b. Diffraction Data for Station 105 Coarse Fraction Samples

SAMPLE I/D : 3652

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	11.60	7.628	.052	4.0
2	20.84	4.262	.016	5.0
3	26.64	3.346	.010	17.0
4	29.44	3.034	.008	10.0
5	30.88	2.896	.007	2.5
6	36.56	2.458	.005	2.5
7	39.44	2.285	.004	2.5

SAMPLE I/D : 12934

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	26.76	3.331	.007	8.5
2	29.46	3.032	.006	10.5
3	31.01	2.884	.005	3.5
4	31.81	2.813	.005	12.0
5	36.00	2.495	.004	1.5
6	39.44	2.285	.003	2.0
7	43.17	2.096	.003	1.5
8	45.40	1.998	.002	3.0
9	47.47	1.915	.002	1.5
10	48.50	1.877	.002	1.5

SAMPLE I/D : 15927

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	26.66	3.343	.007	16.0
2	29.41	3.037	.006	8.0
3	30.79	2.904	.005	3.0
4	35.38	2.537	.004	2.0
5	39.39	2.287	.003	2.0
6	43.06	2.100	.003	1.5
7	49.94	1.826	.002	2.5

SAMPLE I/D : 19776

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	26.64	3.346	.007	7.0
2	29.16	3.062	.006	2.0
3	29.45	3.033	.006	6.0
4	30.82	2.901	.005	2.5
5	32.55	2.751	.005	4.0
6	35.30	2.543	.004	2.0

SAMPLE I/D : 20118

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	14.58	6.074	.024	11.0
2	26.68	3.341	.007	13.0
3	29.49	3.028	.006	8.5
4	31.79	2.815	.005	23.0
5	34.43	2.605	.004	13.0
6	36.26	2.477	.004	26.0
7	39.47	2.283	.003	2.5
8	47.39	1.918	.002	7.0

SAMPLE I/D : 21018

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	20.89	4.252	.012	5.5
2	23.07	3.855	.009	2.5
3	26.68	3.341	.007	19.0
4	27.43	3.252	.007	1.5
5	29.49	3.028	.006	27.5
6	30.93	2.891	.005	6.0
7	35.34	2.540	.004	1.5
8	36.03	2.493	.004	2.5
9	39.47	2.283	.003	5.5
10	40.96	2.203	.003	1.5
11	43.14	2.097	.003	3.5
12	47.04	1.932	.002	1.5
13	47.39	1.918	.002	2.5
14	48.42	1.880	.002	3.0
15	50.02	1.823	.002	1.5

Table 2c. Diffraction Data for Station 118 Coarse Fraction Samples

SAMPLE I/D : 8961

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	21.82	4.072	.011	2.0
2	26.70	3.339	.007	12.5
3	29.45	3.033	.006	8.5
4	30.83	2.900	.005	2.5
5	39.37	2.288	.003	2.0
6	43.16	2.096	.003	1.0

SAMPLE I/D : 20480

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	20.81	4.268	.016	5.0
2	26.65	3.345	.010	16.0
3	29.45	3.033	.008	34.0
4	30.81	2.902	.007	7.0
5	39.45	2.284	.004	3.0
6	43.17	2.096	.004	2.0
7	47.57	1.911	.003	1.5
8	48.53	1.876	.003	1.5

SAMPLE I/D : 19707

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	20.91	4.248	.015	5.0
2	23.17	3.838	.012	5.0
3	26.67	3.343	.009	33.0
4	29.51	3.027	.007	43.0
5	30.82	2.901	.007	9.0
6	35.99	2.495	.005	5.0
7	39.42	2.286	.004	6.0
8	41.02	2.200	.004	3.0
9	43.13	2.097	.003	4.0
10	47.50	1.914	.003	3.0
11	48.45	1.879	.003	4.0
12	50.05	1.822	.002	3.0

SAMPLE I/D : 21352

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	20.94	4.243	.011	6.0
2	23.06	3.857	.009	2.0
3	23.75	3.746	.009	2.0
4	26.73	3.335	.007	22.0
5	29.48	3.030	.006	5.0
6	30.86	2.897	.005	1.0
7	34.87	2.573	.004	1.0
8	36.48	2.463	.004	1.0
9	39.35	2.290	.003	2.5
10	49.96	1.826	.002	2.0

SAMPLE I/D : 20472

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	20.86	4.258	.016	6.0
2	26.66	3.344	.010	30.0
3	29.42	3.036	.008	18.0
4	30.94	2.890	.007	6.0
5	31.62	2.830	.007	2.0
6	32.54	2.752	.007	4.0
7	39.42	2.286	.004	3.0
8	43.22	2.093	.004	2.0
9	47.10	1.929	.003	2.0
10	47.54	1.913	.003	2.0
11	48.54	1.875	.003	2.0

SAMPLE I/D : 23518

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	26.61	3.350	.009	5.0
2	29.47	3.030	.007	4.0
3	31.75	2.818	.006	20.0
4	45.36	1.999	.003	4.0

Table 2d. Diffraction Data for Station 124 Coarse Fraction Samples

SAMPLE I/D : 7717

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	26.98	3.305	.007	6.0

SAMPLE I/D : 8612

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	26.66	3.344	.007	12.0
2	29.47	3.031	.006	6.0
3	39.45	2.284	.003	1.5

SAMPLE I/D : 14780

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	20.84	4.262	.012	7.0
2	26.69	3.339	.007	46.0
3	29.39	3.039	.006	6.5
4	30.82	2.901	.005	2.5
5	39.48	2.282	.003	2.0
6	49.98	1.825	.002	2.0

SAMPLE I/D : 16029

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	20.93	4.244	.011	13.0
2	26.67	3.343	.007	30.0
3	29.48	3.030	.006	12.0
4	36.59	2.456	.004	2.0
5	39.40	2.287	.003	2.0
6	42.38	2.133	.003	2.0
7	43.19	2.095	.003	2.0
8	47.43	1.917	.002	1.5
9	48.40	1.880	.002	1.0
10	50.01	1.824	.002	5.0

SAMPLE I/D : 16674

LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	21.18	4.194	.016	13.0
2	26.92	3.312	.010	30.0
3	29.73	3.005	.008	12.0
4	36.84	2.440	.005	2.0
5	39.65	2.273	.004	2.0
6	42.63	2.121	.004	2.0
7	43.44	2.083	.004	2.0
8	47.69	1.907	.003	1.5
9	48.66	1.871	.003	1.0
10	50.27	1.815	.003	5.0

SAMPLE I/D : 19276

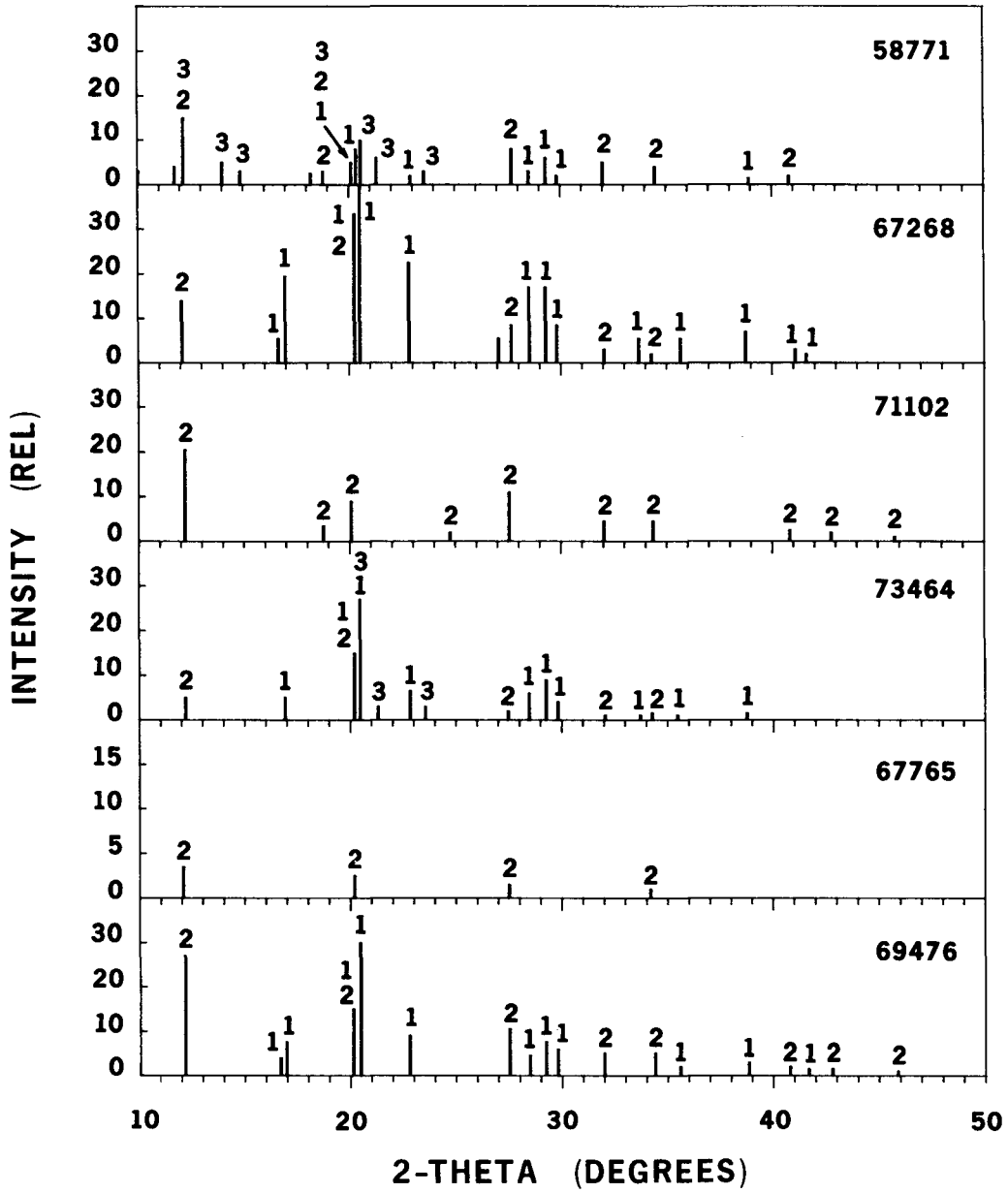
LINE	2-TH(DEG)	D(ANG)	ERR-D	INT
1	26.60	3.351	.007	11.0
2	27.00	3.302	.007	4.0

FIGURE CAPTIONS

Figure 1. Diffraction patterns in bar graph form for the fine particle samples. (a) Station 103 (b) Station 105 (c) Station 118 (d) Station 124.

Figure 1. Diffraction patterns in bar graph form for the coarse particle samples. (a) Station 103 (b) Station 105 (c) Station 118 (d) Station 124.

Station 103 (Fine Fraction)

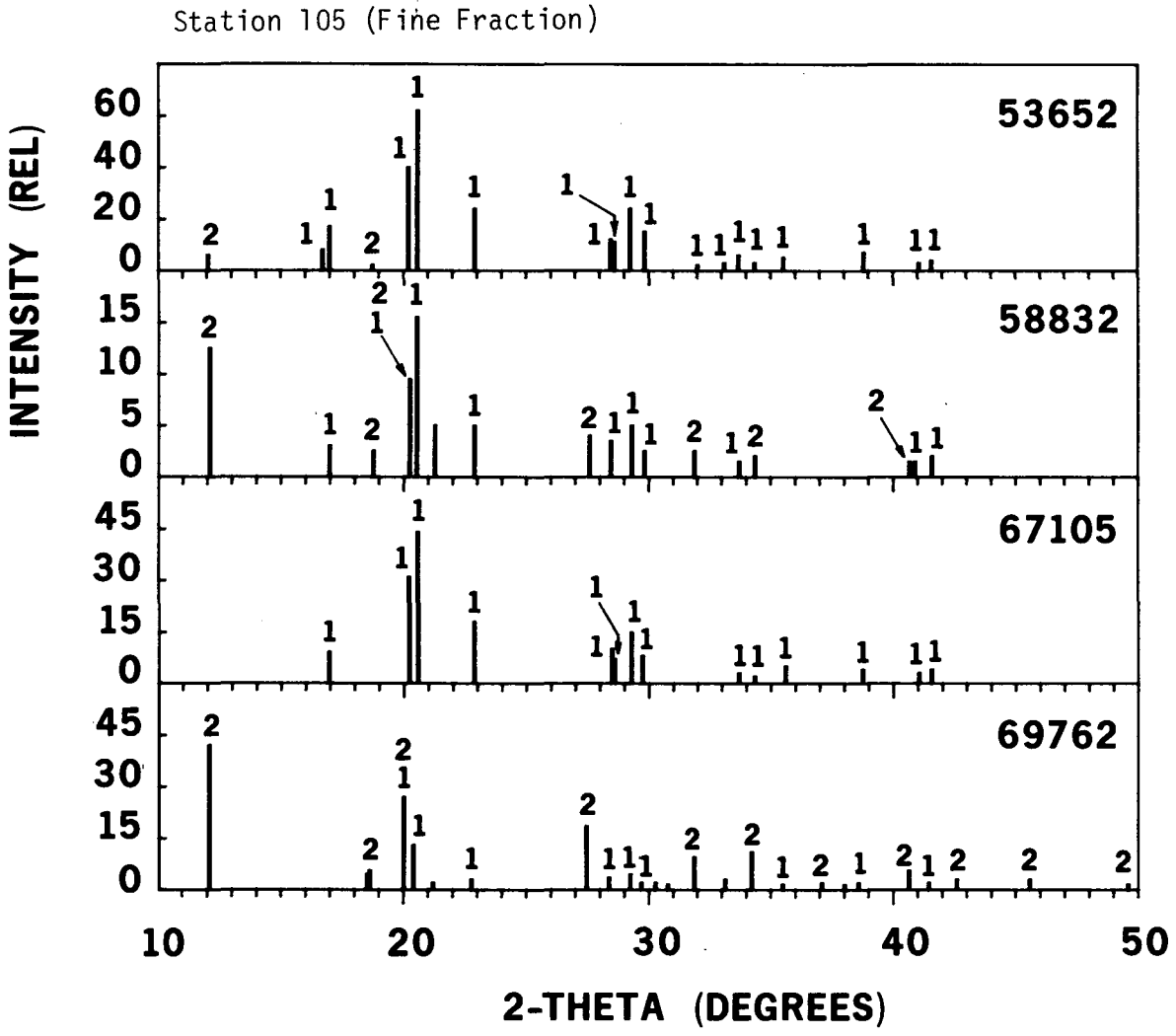


1=$(NH_4)_2SO_4$

2=$(NH_4)_2SO_4.PbSO_4$

3=$(NH_4)_2SO_4.ZnSO_4.6H_2O$

XBL 799-11779



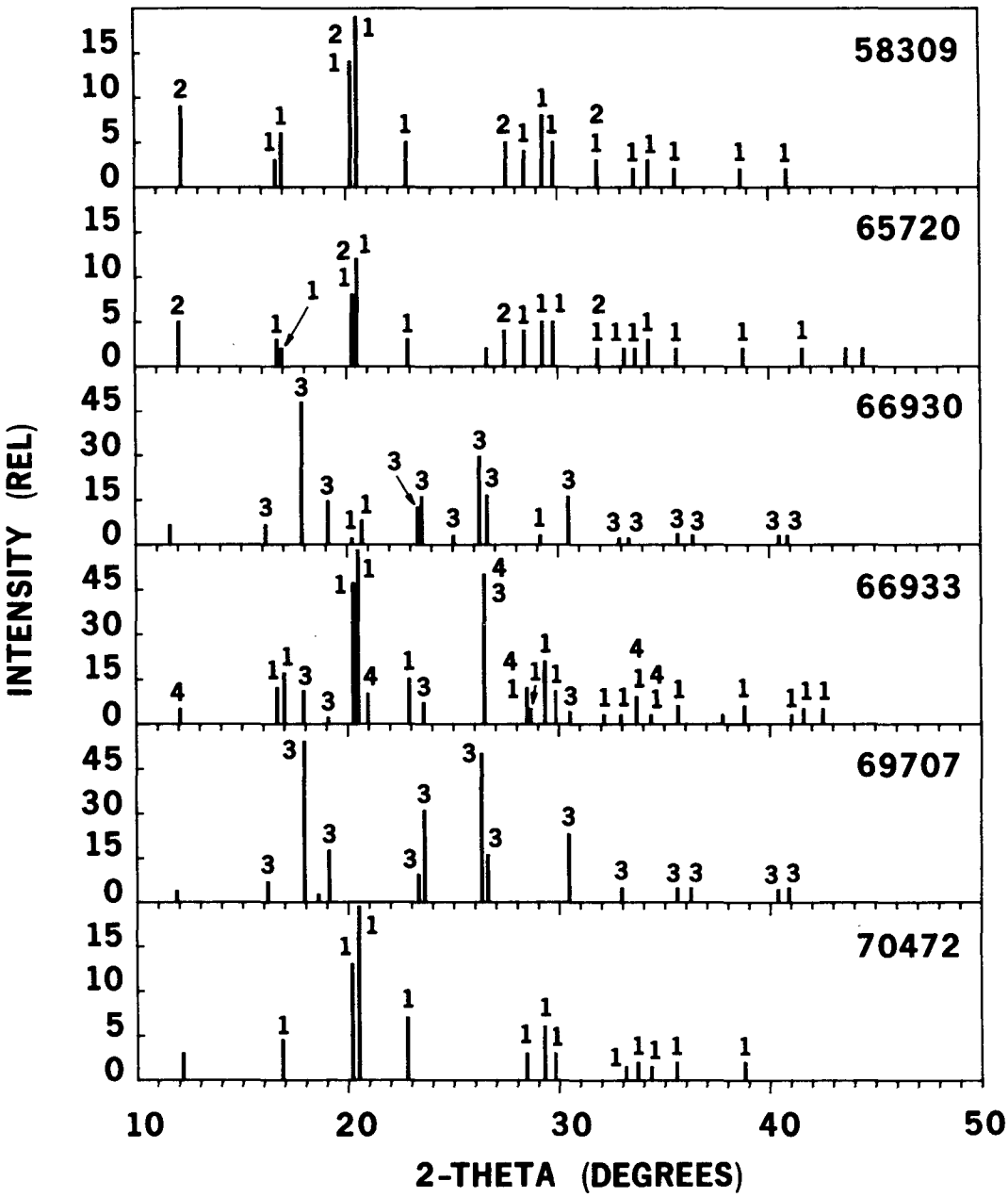
1=$(NH_4)_2SO_4$

2=$(NH_4)_2SO_4.PbSO_4$

XBL 7910-12596

Fig. 1c

Station 118 (Fine Fraction)



1=$(NH_4)_2SO_4$

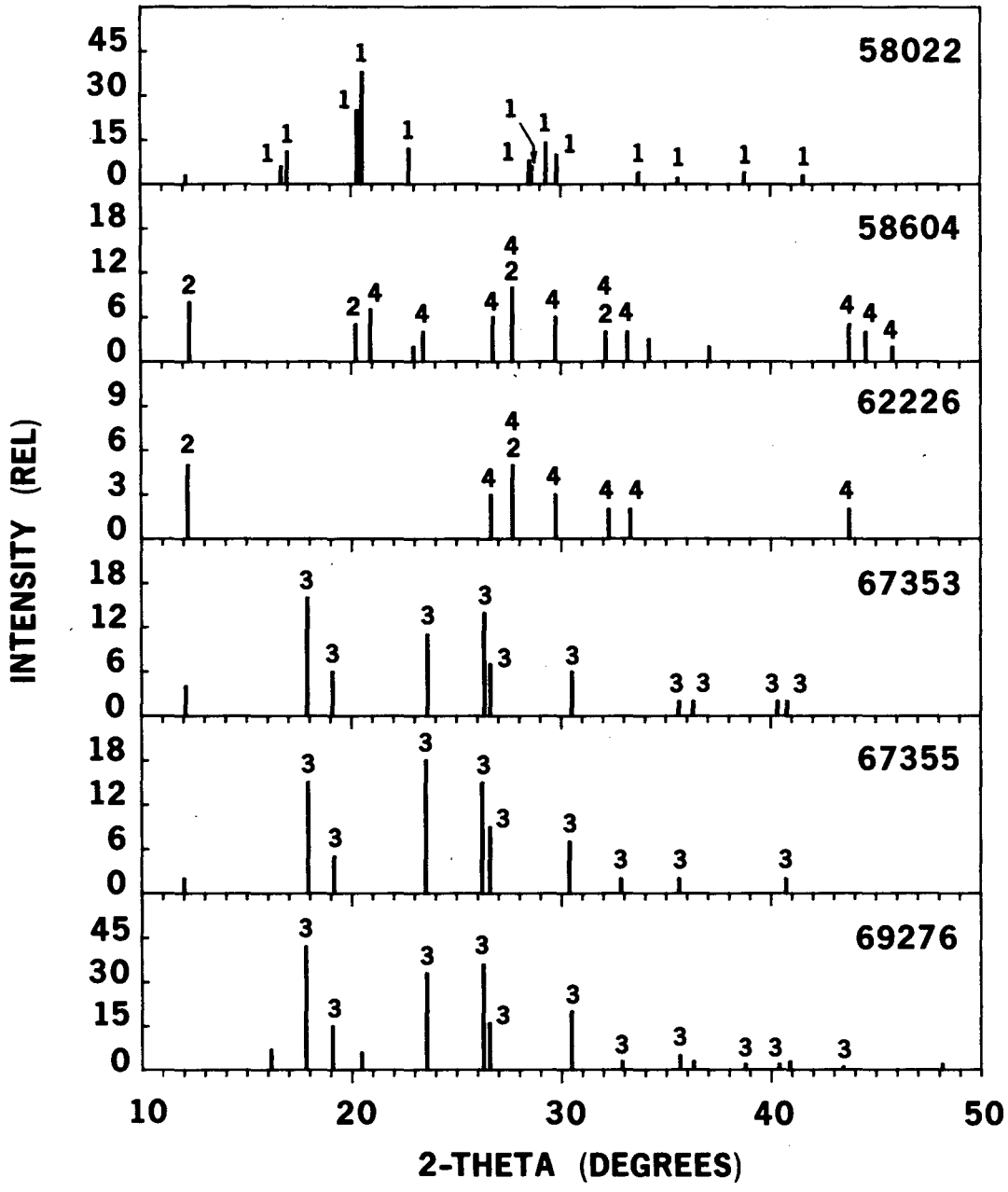
2=$(NH_4)_2SO_4.PbSO_4$

3=$3(NH_4)_2SO_4.H_2SO_4$

4=$CaAl_2Si_2O_{16}.4H_2O$

XBL 7910-12597

Station 124 (Fine Fraction)



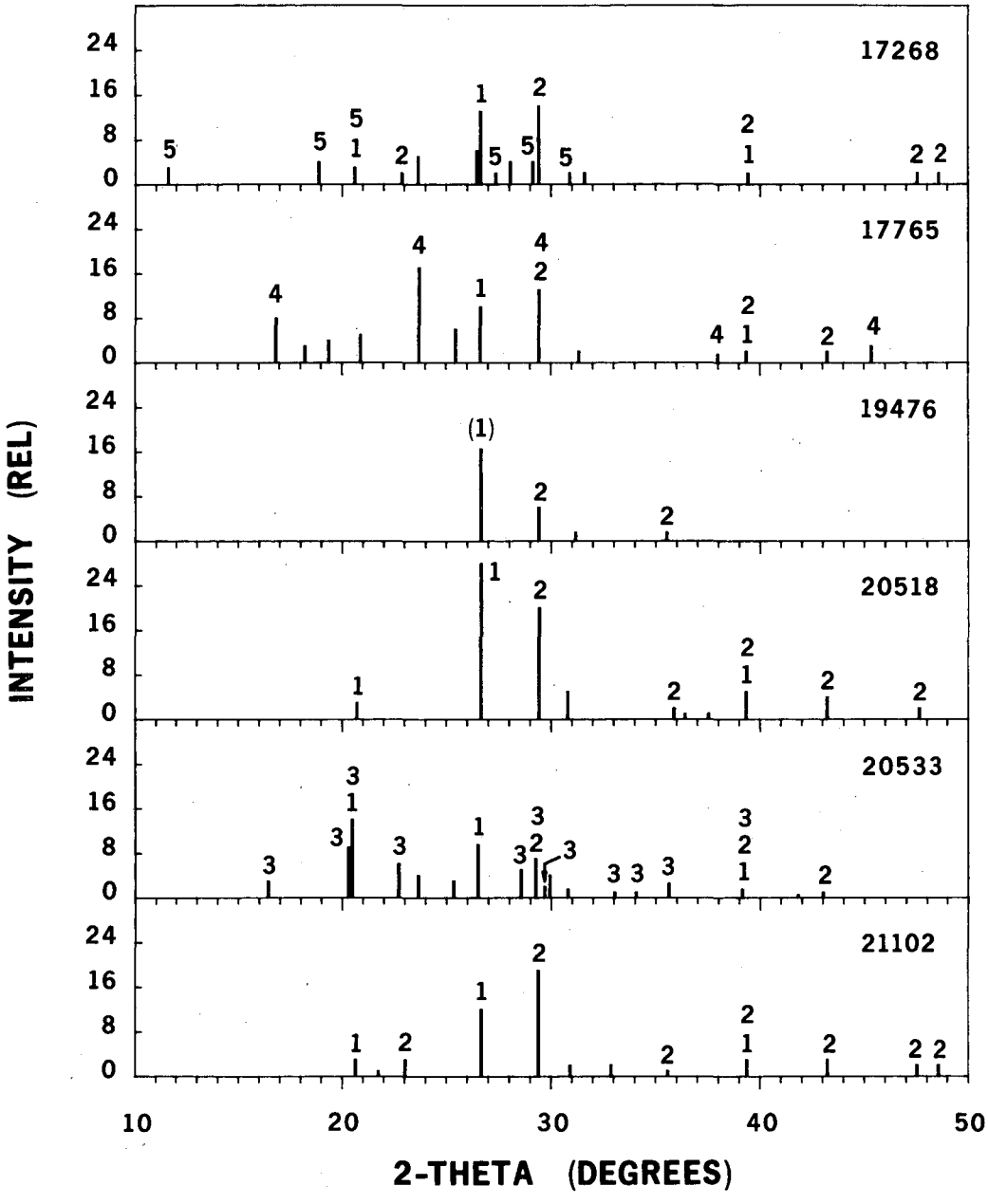
1=$(NH_4)_2SO_4$ 4=$PbSO_4$

2=$(NH_4)_2SO_4.PbSO_4$

3=$3(NH_4)_2SO_4.H_2SO_4$

XBL 7910-12598

Station 103 (Coarse Fraction)



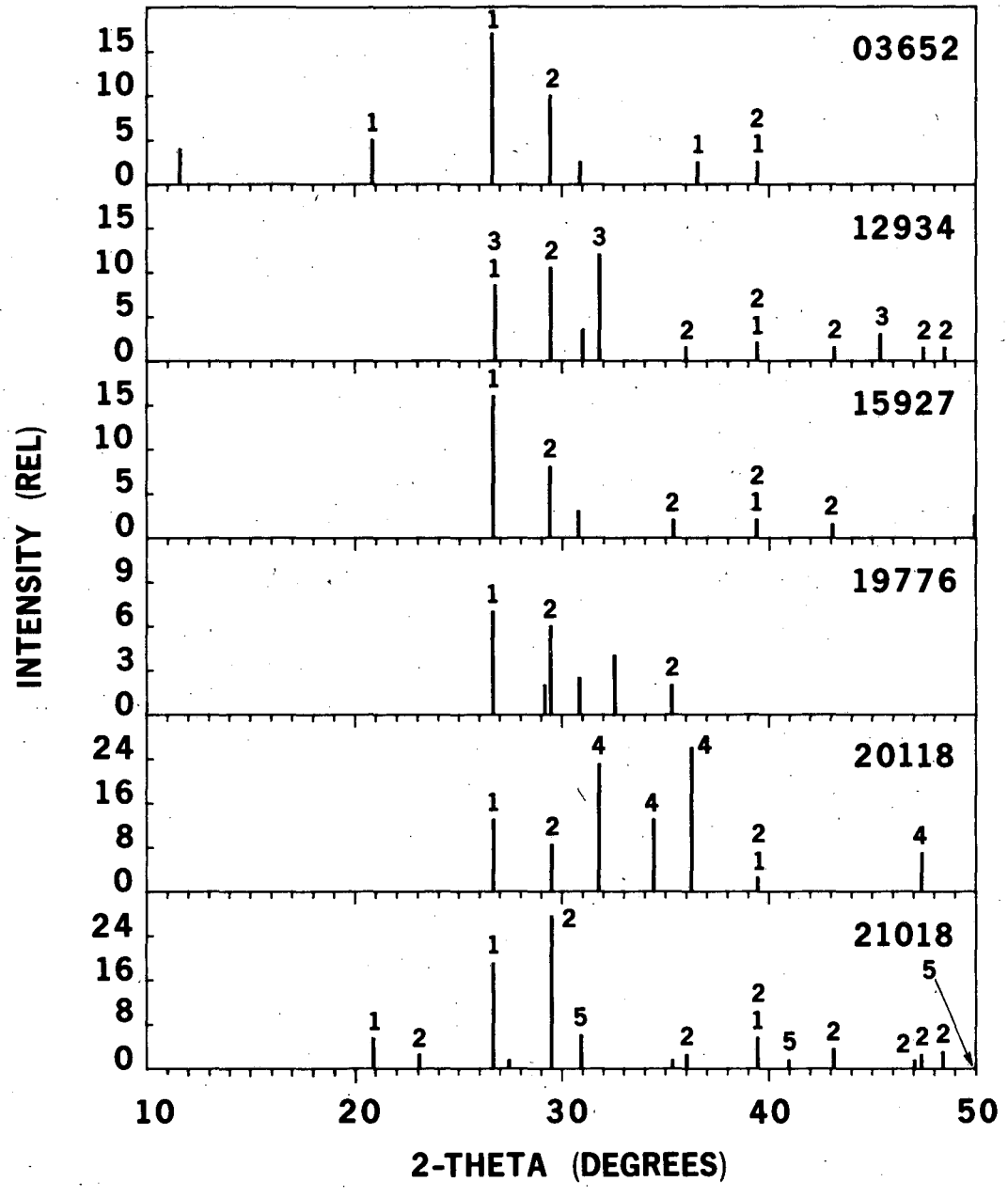
1=SiO_2 4=$(0.7NH_4H_2PO_4).(0.3KH_2PO_4)$

2=$CaCO_3$ 5=$CaAl_2Si_2O_{16}.4H_2O$

3=$(NH_4)_2SO_4$

XBL 799-11778

Station 105 (Coarse Fraction)



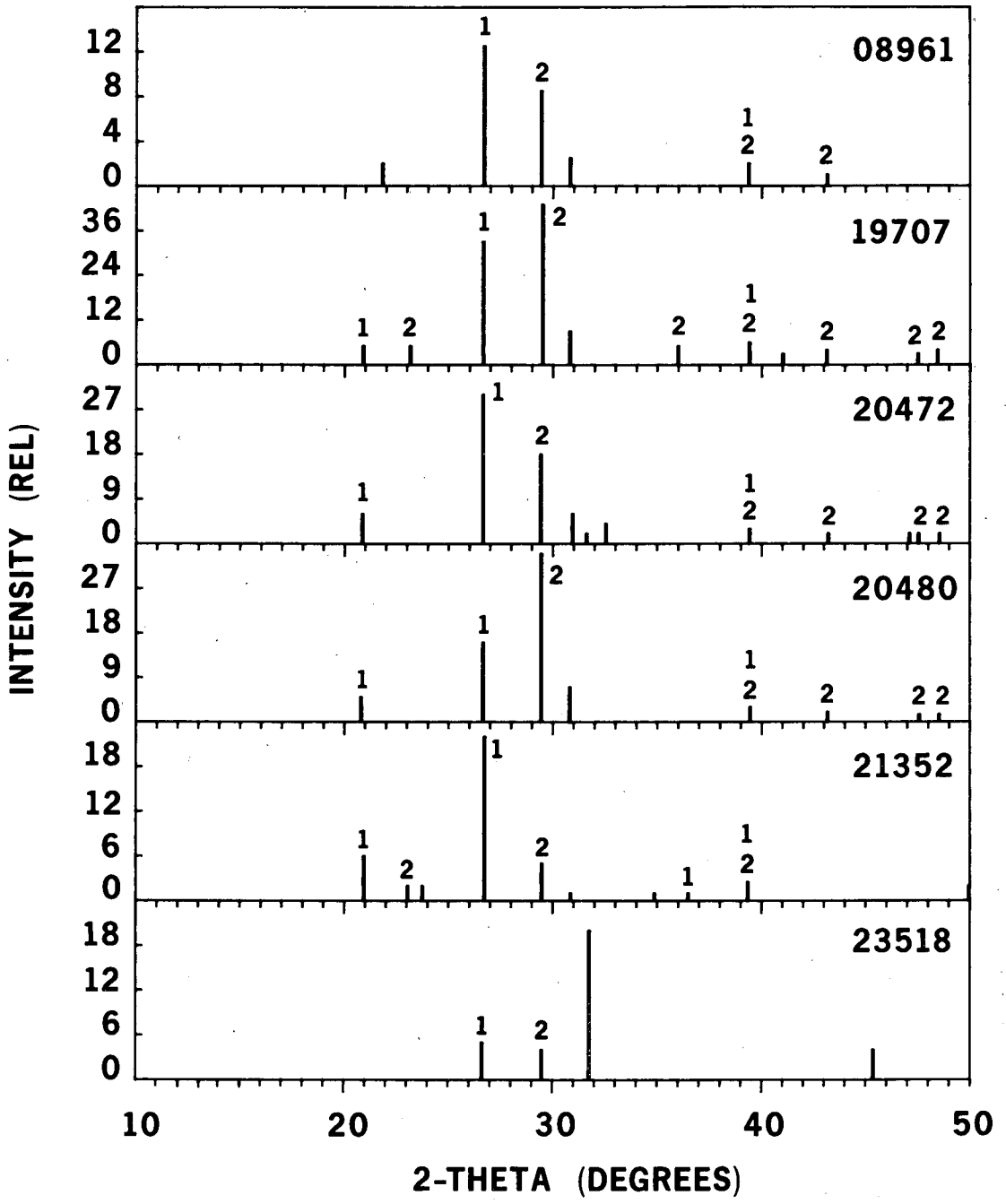
1=SiO_2 4=ZnO

2=$CaCO_3$ 5=$(CaMg)CO_3$

3=NaCl

XBL 7910-12599

Station 118 (Coarse Fraction)

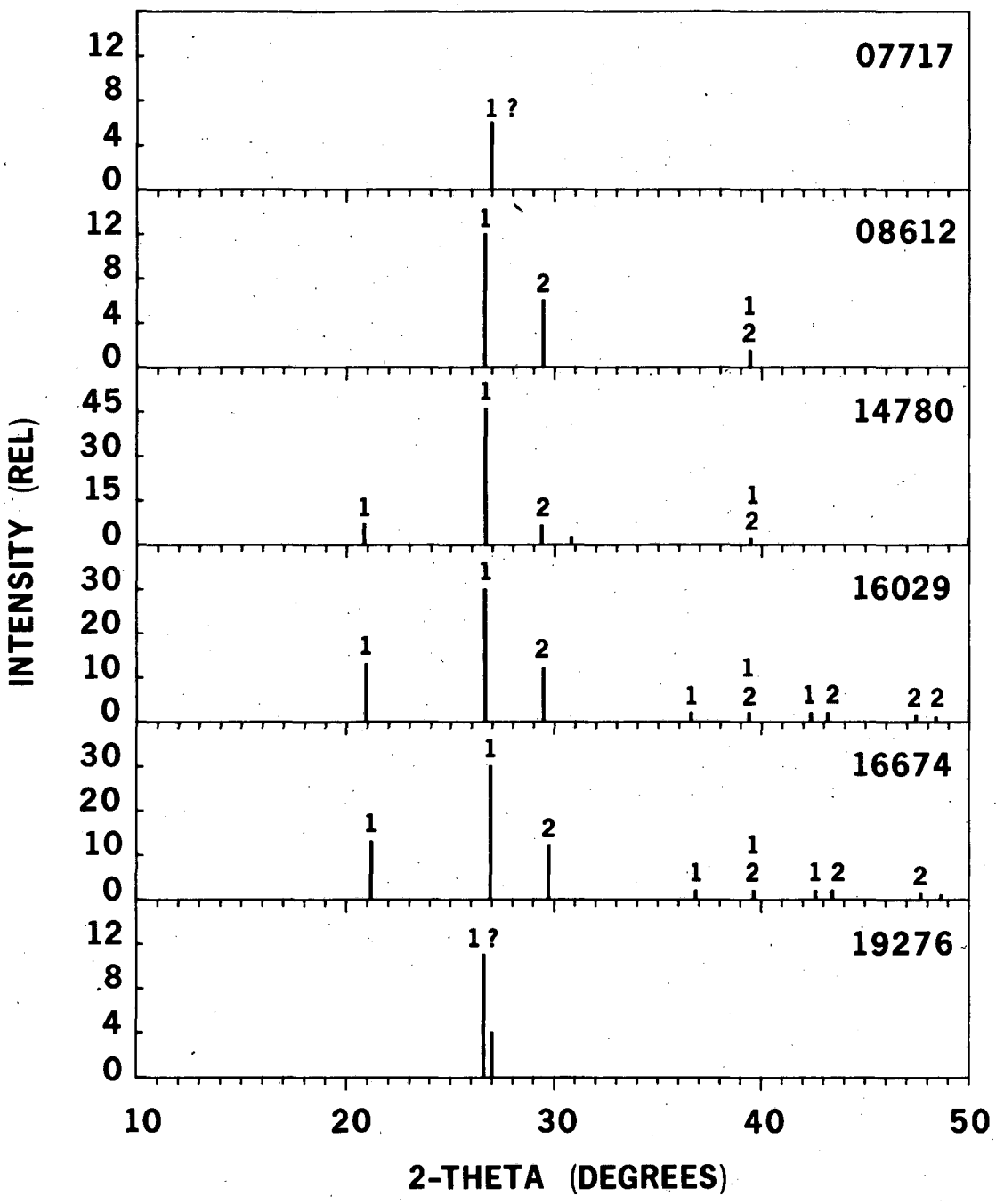


1=SiO_2

2=$CaCO_3$

XBL 7910-12600

Station 124 (Coarse Fraction)



1=SiO_2

2=$CaCO_3$

XBL 7910-12595

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