Table 1. *Naphthylaminesulphonic acids*

	a	*b*	*c*	*β*	ϱ(obs)	ϱ(calc)	*Z*	Space group
1-Naphthylamine-2-sulphonic acid	17·22 Å	10·91 Å	10·07 Å	–	1·552	1·567	8	$P2_1ca$
1-Naphthylamine-3-sulphonic acid	12·78	11·70	6·82	—	1·474	1·451	4	$Pbn2_1$
1-Naphthylamine-4-sulphonic acid (naphthionic acid)	16·54	15·20	7·84	—	1·498	1·506	8	*P2na*
1-Naphthylamine-5-sulphonic acid monohydrate	16·77	7·84	8·05	96°	1·518	1·521	4	$P2_1/a$
1-Naphthylamine-6-sulphonic acid	16·25	11·12	10·57	—	1·560	1·552	8	*Pbca*
1-Naphthylamine-7-sulphonic acid monohydrate	16·44	8·91	7·14	—	1·514	1·533	4	$Pc2_1n$
1-Naphthylamine-8-sulphonic acid	14·04	10·76	6·93	—	1·444	1·474	4	*P2an*

Table 2. *Salts of 1-naphthylamine-4-sulphonic acid*

	a	*b*	*c*	*β*	ϱ(obs)	ϱ(calc)	*Z*	Space group
Ammonium naphthionate monohydrate	20·00 Å	10·79 Å	10·83 Å	95·0°	1·467	1·467	8	$P2_1/n$
Lithium naphthionate trihydrate	12·80	9·81	12·14	122·14	1·48	1·46	4	$P2_1/n$
Sodium naphthionate tetrahydrate	11·61	12·05	10·04	98·8	1·513	1·516	4	$P2_1/c$
Potassium naphthionate	34·40	8·60	7·06	—	1·68	1·668	8	$P2_1cn$
Thallium naphthionate	17·89	12·51	9·52	—	2·70	2·66	8	*Pbca*
Calcium naphthionate octahydrate	23·52	11·93	9·73	95·0	1·530	1·534	4	$P2_1/n$
Magnesium naphthionate decahydrate	14·08	8·30	12·86	103·0	1·47	1·470	2	$P2_1/a$
Zinc naphthionate enneahydrate	45·22	14·33	8·58	—	1·60	1·604	8	$P2_1ab$
Cobalt naphthionate enneahydrate	45·60	14·35	8·62	—	1·58	1·565	8	$P2_1ab$
Nickel naphthionate enneahydrate	45·60	14·35	8·62	—	1·58	1·565	8	$P2_1ab$

Table 3. *Miscellaneous salts of naphthylaminesulphonic acids*

	a	*b*	*c*	*β*	ϱ(obs)	ϱ(calc)	*Z*	Space group
Sodium 2-naphthylamine-6-sulphonate dihydrate	26·71 Å	11·20 Å	7·91 Å	—	1·588	1·579	8	*Pn2b*
Sodium 1-naphthylamine-5-sulphonate	18·01	8·56	6·99	—	—	1·51	4	$P2_12_12_1$
Potassium 1-naphthylamine-5-sulphonate	18·09	8·63	7·51	—	—	1·48	4	$P2_12_12_1$
Sodium naphthionate/bisulphite addition compound	14·63	9·20	10·25	95·5°	1·72	1·715	4	$P2_1/n$
Sodium naphthionate/bisulphite dimeric addition compound	21·23	—	6·00	—	1·75	1·747	4	$I\bar{4}$
Zinc 1-naphthol-4-sulphonate octahydrate	23·00	11·24	10·64	—	1·584	1·583	4	$P2_12_1n$

No further crystallographic work has been done or is planned to be done on any of the acids listed in Table 1.

A number of salts of 1-naphthylamine-4-sulphonic acid were also investigated. These were readily soluble in water, and well-formed crystals of quite large size could easily be grown. The unit cells and space groups of these are listed in Table 2. It is remarkable that so few of these salts are isomorphous. The zinc, cobalt and nickel salts are obviously isomorphous and isostructural, and the calcium salt appears to be related to the sodium salt by doubling *a*, but otherwise there seem to be no resemblances between members of the series.

The structure of the sodium salt has been fully determined by three-dimensional X-ray analysis (Brown & Corbridge, 1966); some preliminary unpublished work has been done on the [*b*] projection of the calcium salt, and we have taken some photographs of the potassium salt for intensity measurements, but otherwise no further work on these compounds is contemplated. The potassium salt is interesting in that the crystals can easily be bent reversibly without fracture, and cleavage readily occurs parallel to (100).

The cell dimensions and space groups of a few related compounds were also determined and these are listed in Table 3. The preparation and exact formulae of the sodium naphthionate/sodium bisulphite addition compounds are described in a paper on the mechanism of the Bucherer reaction (Cowdrey, 1946).

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Crystal data for ytterbium orthoferrite $YbFeO_3$.

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The recent publication by Eibschütz (1965) on the lattice constants of polycrystalline samples of the orthoferrites of the heavier rare earths prompts a confirmatory report on powder data from a sample of $YbFeO_3$ prepared originally in single-crystal form. The data were obtained in these laboratories in 1960 from a crystal approximately a millimetre cube which was a by-product in the preparation by J. L. Page of crystals of ytterbium iron garnet from a lead-oxide solution.

The powder photograph was taken with a Philips No. 33524 Straumanis camera of diameter 114·6 mm and filtered iron radiation. The lower-angle lines were indexed on the

basis of an orthorhombic cell of space group *Pbnm* (D_{2h}^{16}) by comparison with the data of Geller & Wood (1956) on the lighter rare-earth orthoferrites. Geller (1956) considers space groups *Pbn* (C_{2v}^{9}) unlikely on structural grounds. The lines 132, 024, and 204 which were unequivocally indexed were used to determine lattice constants $a=5{\cdot}22(8)$, $b=5{\cdot}54(6)$, $c=7{\cdot}56(0)$ Å which resulted in the indexing of all the lines. Further refinement of the lattice constants by the use of higher-order reflexions was not attempted in view of the multiple indices possible for these reflexions. Observed and calculated d spacings are listed in Table 1, and closely follow the data of Eibschütz with the exception of one or two differences in the indexing of high-angle lines.

Table 1. *Powder data*

hkl	d_{obs}	d_{calc}	*I**
110	3·784	3·804	*s*
111	3·396	3·398	*ms*
020	2·773	2·773	*m*
112	2·677	2·681	*vs*
200	2·605	2·614	*s*
211	2·249	2·257	*w*
022	2.239	2.236	*w*
202	2·154	2·150	*m*
113	2·101	2·101	*m*
122	2·048	2·056	*vw*
212	2·001	2·005	*vvw*
220	1·901	1·905	*m*
004	1·890	1·890	*m*
023	1·863	1·865	*mw*
221	1·842	1.845	*m*
213	1.717	1·724	*vvw*
222	1·700	1·699	*ms*
131		1·698	
301	1·696	1·698	*w*
310	1.658	1.663	*vw*
311	1·623	1·624	*vw*
132	1·583	1·583	*mw*
024	1.562	1.562	*mw*
204	1.532	1.532	*m*
312	1·519	1.522	*s*
223		1·518	
214	1·469	1·476	*vvw*
320		1·475	
105	1.452	1.453	*vvw*
133	1.435	1.434	*m*
303		1·433	
115	1.406	1.405	*vw*
313	1.386	1.388	*vvw*
040		1.387	
322	1.368	1.375	*w*
041		1.364	
224	1.341	1.341	*m*
140		1·340	
141	1.322	1.320	*vw*
400	1.307	1·307	*w*
215	1.275	1.274	*vw*
323		1·273	
142	1·264	1·263	*vvw*
331	1·252	1·251	*m*
402	1·237	1·235	*vvw*
043	1·217	1·215	*vw*
241	1·210	1·209	*w*
116	1·198	1·196	*m*
225	1·183	1·184	*mw*
143		1·183	
420		1·182	
421	1·169	1·169	*mw*
026	1·144	1·147	*m*
135		1·142	
305		1·142	
413	1·134	1·136	*m*
206		1·135	
333		1·133	
126	1·119	1·120	*w*
315		1·119	
044		1·118	
243	1·104	1·102	*m*
340	1·088	1·085	*w*
150		1·085	
404	1·074	1·075	*ms*
151		1·074	
341		1·074	
423	1·072	1·070	*w*
431	1·055	1·057	*vvw*
325		1·056	
414		1·055	
334		1·053	
152	1·042	1·043	*vw*
342		1·043	
117	1·040	1·039	*vvw*
240	1·029	1·028	*w*
510		1·027	
432		1·027	
045	1·024	1·022	*m*
251	1·008	1·012	*w*
316	1·005	1·004	*ms*
145	1·003	1·003	*m*
424		1·002	
153	0·996	0·997	*ms*
343		0·997	
252	0·984	0·986	*s*
433		0·983	

* *s* strong, *m* medium, *w* weak, *v* very

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