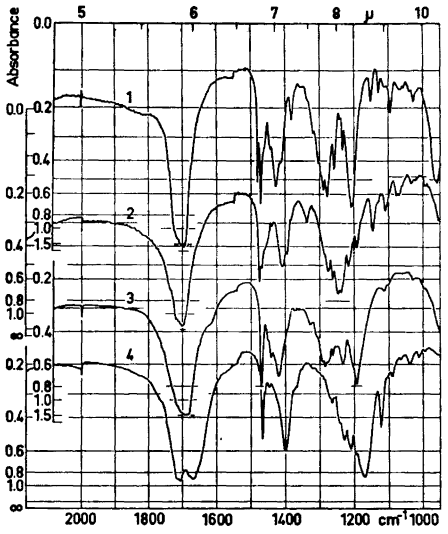

Fig. 1. IR-spectra of the *erythro* and *threo* forms of roccellic and norrangiformic acid. 1. *erythro*-2-Methyl-3-dodecylsuccinic acid (*2*) ((±)-roccellic acid). 2. *threo*-2-Methyl-3-dodecylsuccinic acid (*3*). 3. *erythro*-1,2,3-Heptadecanetricarboxylic acid (*4*). 4. *threo*-1,2,3-Heptadecanetricarboxylic acid (*5*) ((±)-norrangiformic acid).

ylsuccinic acids show a similar absorption pattern, although with minor deviations.[4] The difference between the IR-spectra of the *erythro* and *threo* 1,2-dialkylsuccinic acids may therefore be used to distinguish between the two forms. The reason for the difference is an interesting question. At present, it can only be concluded that this difference must be associated with the manner in which the alkyl groups affect the relative orientation of the carboxyls in the crystal.

Experimental. Roccellic acid (*1*) 0.350 g) was heated in concentrated sulfuric acid (10 ml) at 140° until the solution turned light brown (4 min). Ice was added and the product isolated in the usual way. Recrystallisation from aqueous ethanol gave the crude *erythro* acid (0.160 g). Repeated crystallisations from ethanol gave *erythro*-2-methyl-3-dodecylsuccinic acid (*2*), (0.075 g) m.p. 136–138° (lit.[5] 131–132.5°), identical with a synthetic sample.[1] The mother liquor from the first crystallisation was evaporated to give a mixture of the crude *threo* acid and the corresponding anhydride. The crude product (0.130 g) was treated with alkali, isolated in the usual way and recrystallised from cyclohexane-light petroleum 1: 2 to give *threo*-2-methyl-3-dodecylsuccinic acid (*3*) (0.046 g), m.p. 81–83° (lit.[5] 81–82°).

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The Crystal Structure of Rh_2Ga_9 and Ir_2Ga_9

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In the course of phase analysis and crystal structure studies on platinum metal-gallium systems the phases Rh_2Ga_9 and Ir_2Ga_9 have been synthesized and they were found to be isomorphous with Co_2Al_9.

An alloy of the composition $RhGa_{4.5}$ was prepared from rhodium powder (L. Light & Co., about 99.98 %) and gallium lump (Johnson, Matthey Chemicals Limited 4N) by heating of a mixture of the elements in an evacuated silica tube at 900°C. The reaction was accelerated by shaking the tube; the components reacted violently with an increase in temperature. The alloy was then annealed at 550°C for 2 days. The heat-treatment was discontinued by quenching in water. The product thus obtained was grey, porous and crystalline. However, no single crystals suitable for a single crystal investigation were found.

The compound Ir_3Al_9 was prepared in an analogous way. The iridium powder used has a purity of 99.98 % according to the supplier (L. Light & Co.).

Powder patterns were obtained in a Guinier-Hägg camera with Cu$K\alpha_1$ radiation and with KCl as an internal standard.

A comparison between the powder films obtained from Rh_3Ga_9 and Ir_3Ga_9 and from the corresponding aluminides studied earlier at this Institute,[1] *viz.* Rh_3Al_9 and Ir_3Al_9, showed that the structures are most probably isomorphous and thus of the Co_3Al_9 type.

The following cell dimensions were found for Rh_3Ga_9:

$a = 6.448 \pm 2$, $b = 6.405 \pm 2$, $c = 8.829 \pm 2$ Å, $\beta = 96.85° \pm 4°$

and the following were obtained for Ir_3Ga_9:

$a = 6.467 \pm 2$, $b = 6.409 \pm 2$, $c = 8.853 \pm 2$ Å, $\beta = 96.92° \pm 4°$

Table 1. The powder pattern of Rh_3Ga_9 (Cu$K\alpha_1$, $\lambda = 1.5405$ Å).

I_{obs}	$\sin^2\theta_{obs}$	$h\ k\ l$	$\sin^2\theta_{calc}$
—	—	1 0 0	0.01448
m	0.02212	0 1 1	0.02218
m+	0.02888	1 1 0	0.02894
vvw	~0.031	0 0 2	0.03088
w	0.03543	$\bar{1}$ 1 1	0.03540
w+	0.03797	1 1 1	0.03792
w	0.04287	$\bar{1}$ 0 2	0.04283
m	0.04534	0 1 2	0.04534
vw	0.04790	1 0 2	0.04788
—	—	$\bar{1}$ 1 2	0.05730
—	—	0 2 0	0.05785
vw	0.05789	2 0 0	0.05790
—	—	1 1 2	0.06234
m	0.06557	0 2 1	0.06557
vw	0.07232	1 2 0	0.07233
		2 1 0	0.07237
vvw	~0.0776	$\bar{2}$ 1 1	0.07756
w	0.07877	$\bar{1}$ 2 1	0.07879
—	—	1 2 1	0.08131
st	0.08256	2 1 1	0.08261
m	~0.0839	$\bar{2}$ 0 2	0.08374
		0 1 3	0.08394
vvw	~0.0887	0 2 2	0.08873
vw	0.09384	2 0 2	0.09383
vw	0.09468	$\bar{1}$ 1 3	0.09464
m+	0.09819	$\bar{2}$ 1 2	0.09820
st	0.10070	$\bar{1}$ 2 2	0.10069
vvw	~0.102	1 1 3	0.10220
st	0.10573	1 2 2	0.10573
st	0.10825	2 1 2	0.10829
—	—	2 2 0	0.11576
m	0.12096	$\bar{2}$ 2 1	0.12095
m	0.12355	0 0 4	0.12352

Table 2. The powder pattern of Ir_3Ga_9 (Cu$K\alpha_1$, $\lambda = 1.5405$ Å).

I_{obs}	$\sin^2\theta_{obs}$	$h\ k\ l$	$\sin^2\theta_{calc}$
—	—	1 0 0	0.01439
m	0.02214	0 1 1	0.02213
st	0.02885	1 1 0	0.02884
w	0.03075	0 0 2	0.03072
m	0.03522	$\bar{1}$ 1 1	0.03526
m+	0.03780	1 1 1	0.03779
m	0.04259	$\bar{1}$ 0 2	0.04258
m+	0.04516	0 1 2	0.04517
m	0.04763	1 0 2	0.04765
—	—	$\bar{1}$ 1 2	0.05703
m	0.05757	2 0 0	0.05757
—	—	0 2 0	0.05778
vvw	~0.0621	1 1 2	0.06209
st	0.06549	0 2 1	0.06547
—	—	2 1 0	0.07202
—	—	1 2 0	0.07217
vw	0.07713	$\bar{2}$ 1 1	0.07716
—	—	$\bar{1}$ 2 1	0.07859
—	—	1 2 1	0.08112
w	0.08225	2 1 1	0.08223
w	0.08321	$\bar{2}$ 0 2	0.08323
w	0.08356	0 1 3	0.08357
—	—	0 2 2	0.08850
—	—	2 0 2	0.09336
vw	0.09417	$\bar{1}$ 1 3	0.09417
vw	0.09767	$\bar{2}$ 1 2	0.09767
st	0.10033	$\bar{1}$ 2 2	0.10036
vvw	~0.102	1 1 3	0.10176
st	0.10542	1 2 2	0.10543
st	0.10778	2 1 2	0.10780
vvw	~0.115	2 2 0	0.11535
st	0.12051	$\bar{2}$ 2 1	0.12051
w	0.12289	0 0 4	0.12990

The powder patterns of Rh_3Ga_9 and Ir_3Ga_9 are given in Table 1 and Table 2, respectively. No changes of these patterns were observed when comparing powder films taken from alloys of different compositions around $RhAl_{4.5}$ and $IrAl_{4.5}$.

Further studies on the Rh—Ga and the Ir—Ga systems are in progress.

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