COMPONENTS:	EVALUATOR:
(1) Potassium pentanoate (potassium valerate); $(C_5H_9O_2)K$; [19455-21-1] (2) Sodium pentanoate (sodium valerate); $(C_5H_9O_2)Na$; [6106-41-8]	Schiraldi, A., Dipartimento di Chimica Fisica, Universita' di Pavia (ITALY).

CRITICAL EVALUATION:

This system was studied only by Dmitrevskaya and Sokolov (Ref. 1), who claimed that continuous series of solid solutions exist.

Both components, however, form liquid crystals (see Preface, Table 1). Consequently: (i) the fusion temperatures, $T_{fus}(1)$= 717 K (444 °C) and $T_{fus}(2)$= 630 K (357 °C) given in Ref. 1, are actually to be identified with the clearing temperatures (the corresponding values from Preface, Table 1 being 716±2 K and 631±4 K, respectively); (ii) the transition temperatures $T_{trs}(1)$= 580 K (307 °C) and $T_{trs}(2)$= 489 K (216 °C) quoted in Ref. 1 from Ref. 2, are in turn to be identified with the actual fusion temperatures (the corresponding values from Table 1 of the Preface being 586.6±0.7 K and 498±2 K, respectively).

Continuous series of liquid crystal (instead of solid) solutions ought to form, and the phase diagram ought to be similar to that shown in Preface, Scheme C.1.

Moreover, the following point deserves attention. For component 2, Table 1 of the Preface reports no solid state transition, whereas Dmitrevskaya and Sokolov quote (again from Ref. 2) $T_{trs}(2)$/K= 482 and 453. It is, however, to be stressed that the single transition observed (at 479±1 K) with DTA in sodium n-pentanoate by Duruz et al. (Ref. 3) was not more mentioned in a subsequent DSC investigation by the same group (Ref. 4).

In conlusion, due to the lack of information about the boundaries of the mesomorphic liquid field, and to conflicting assertions about solid state transitions, a re-investigation of the system would be desirable.

REFERENCES:

(1) Dmitrevskaya, O.I.; Sokolov, N.M.
Zh. Obshch. Khim. 1965, 35, 1905-1909.

(2) Sokolov, N.M.
Tezisy Dokl. X Nauch. Konf. S.M.I. 1956.

(3) Duruz, J.J.; Michels, H.J.; Ubbelohde, A.R.
Proc. Roy. Soc. London 1971, A322, 281-299.

(4) Michels, H.J.; Ubbelohde, A.R.
JCS Perkin II 1972, 1879-1881.

COMPONENTS:

(1) Potassium pentanoate (potassium valerate); $(C_5H_9O_2)K$; [19455-21-1]
(2) Sodium pentanoate (sodium valerate); $(C_5H_9O_2)Na$; [6106-41-8]

ORIGINAL MEASUREMENTS:

Dmitrevskaya, O.I.; Sokolov, N.M.
Zh. Obshch. Khim. 1965, 35, 1905-1909.

VARIABLES:

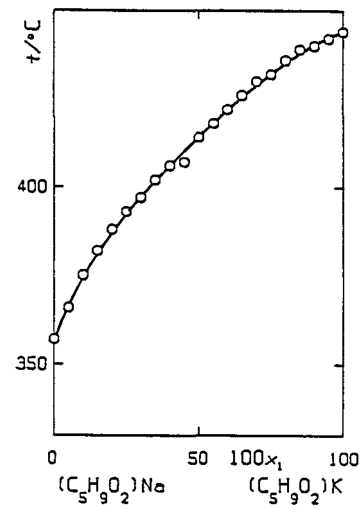
Temperature.

PREPARED BY:

Baldini, P.

EXPERIMENTAL VALUES:

$t/^{o}C$	T/K^{a}	$100x_1$
357	630	0
366	639	5
375	648	10
382	655	15
388	661	20
393	666	25
397	670	30
402	675	35
406	679	40
407	680	45
414	687	50
418	691	55
422	695	60
426	699	65
430	703	70
432	705	75
436	709	80
439	712	85
440	713	90
442	715	95
444	717	100



[a]T/K values calculated by the compiler.

Characteristic point(s): Continuous series of solid solutions.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Visual polythermal analysis.

SOURCE AND PURITY OF MATERIALS:

Both components prepared from n-pentanoic acid and the proper carbonate (Ref. 1). Component 1 undergoes a phase transition at $t_{trs}(1)/^{o}C = 307$ (Ref. 2).
Component 2 undergoes phase transitions at $t_{trs}(2)/^{o}C = 180, 209, 216$ (Ref. 2).

ESTIMATED ERROR:

Temperature: accuracy probably ± 2 K (compiler).

REFERENCES:

(1) Sokolov, N.M.
Zh. Obshch. Khim. 1954, 24, 1581-1593.
(2) Sokolov, N.M.
Tezisy Dokl. X Nauch. Konf. S.M.I. 1956.

COMPONENTS:	EVALUATOR:
(1) Magnesium pentanoate (magnesium valerate); $(C_5H_9O_2)_2Mg$; [556-37-6] (2) Sodium pentanoate (sodium valerate); $(C_5H_9O_2)_2Na_2$; [6106-41-8]	Franzosini, P., Dipartimento di Chimica Fisica, Universita' di Pavia (ITALY).

CRITICAL EVALUATION:

This binary was studied only by Pochtakova (Ref. 1) who employed the visual polythermal analysis to draw the lower boundary of the isotropic liquid region at $0 \leq 100x_1 \leq 72.5$ (the investigation of mixtures richer in component 1 being prevented by their tendency to form glasses). She claimed the occurrence of an incongruently melting intermediate compound, i.e, $(C_5H_9O_2)_8Mg_3Na_2$, able to give a eutectic with component 2.

The latter component, however, forms liquid crystals. Consequently, the topology of the phase diagram at $0 \leq 100x_1 \leq 55$ could be described more correctly with (possible) reference to Scheme D.1 of the Preface: accordingly, Pochtakova's eutectic ought to be an M'_E point, and an invariant type M_E (undetected by visual polythermal analysis) ought to exist at $100x_1 < 55$.

A few more points are worth mentioning.

(i) Pochtakova's (extrapolated) fusion temperature of component 1 (537 K) seems reasonable, although somewhat higher than the only other value provided by the literature (531 K; Ref. 2), while her $T_{fus}(2)$ value (630 K) agrees fairly with the clearing temperature (631±4 K) listed in Preface, Table 1 for component 2.

(ii) For the same component, Table 1 of the Preface provides also a $T_{fus}(2)$= 498±2 K, a figure which can be identified (even if not fully satisfactorily) with that (489 K) corresponding to the highest phase transformation temperature quoted by Pochtakova from Ref. 3.

(iii) Once more for component 2, Table 1 of the Preface reports no solid state transition, whereas Pochtakova quotes (from Ref. 3) $T_{trs}(2)/K$= 482 and 453. It is, however, to be stressed that the single transition observed (at 479±1 K) with DTA in sodium n-pentanoate by Duruz et al. (Ref. 4) was not more mentioned in a subsequent DSC investigation by the same group (Ref. 5).

In conlusion, due to the lack of information about the boundaries of the mesomorphic liquid field, and to conflicting assertions about solid state transitions, a re-investigation of the system would be desirable.

REFERENCES:

(1) Pochtakova, E.I. **Zh. Obshch. Khim.** 1974, 44, 241-248.

(2) Sanesi, M.; Cingolani, A.; Tonelli, P.L.; Franzosini, P. **Thermal Properties, in Thermodynamic and Transport Properties of Organic Salts,** IUPAC Chemical Data Series No. 28 (Franzosini, P.; Sanesi, M.; Editors), Pergamon Press, Oxford, 1980, 29-115.

(3) Sokolov, N.M. **Tezisy Dokl. X Nauch. Konf. S.M.I.** 1956.

(4) Duruz, J.J.; Michels, H.J.; Ubbelohde, A.R. **Proc. Roy. Soc. London** 1971, A322, 281-299.

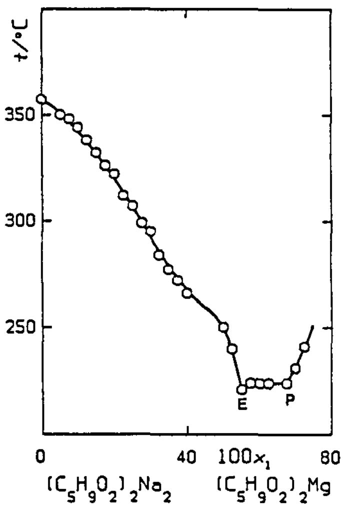
(5) Michels, H.J.; Ubbelohde, A.R. **JCS Perkin II** 1972, 1879-1881.

COMPONENTS:	ORIGINAL MEASUREMENTS:
(1) Magnesium pentanoate (magnesium valerate); $(C_5H_9O_2)_2Mg$; [556-37-6] (2) Sodium pentanoate (sodium valerate); $(C_5H_9O_2)_2Na_2$; [6106-41-8]	Pochtakova, E.I. **Zh. Obshch. Khim.** 1974, 44, 241-248.
VARIABLES:	PREPARED BY:
Temperature.	Baldini, P.

EXPERIMENTAL VALUES:

t/°C	T/K[a]	$100x_1$	t/°C	T/K[a]	$100x_1$
357	630	0	277	550	35
350	623	5	272	545	37.5
348	621	7.5	266	539	40
344	617	10	250	523	50
338	611	12.5	240	513	52.5
332	605	15	221	494	55
326	599	17.5	224	497	57.5
322	595	20	224	497	60
312	585	22.5	224	497	62.5
307	580	25	224	497	67.5
299	572	27.5	231	504	70
295	568	30	241	514	72.5
284	557	32.5			

[a] T/K values calculated by the compiler.



Characteristic point(s):

Eutectic, E, at 221 °C and $100x_1$ = 55 (author).
Peritectic, P, at 224 °C and $100x_1$ = 67.5 (author).

Intermediate compound(s):

$(C_5H_9O_2)_8Mg_3Na_2$ (probable composition), incongruently melting (author).

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Visual polythermal analysis.

NOTE:

The system was investigated at $0 \le 100x_1 \le 72.5$ due to the tendency of component 1 to form glasses.

SOURCE AND PURITY OF MATERIALS:

Materials prepared (Ref. 1) by reacting the proper ("chemically pure") carbonate with a slight excess of n-pentanoic acid of analytical purity.
Component 1: t_{fus}/°C (extrapolated) at 264.
Component 2 undergoes phase transitions at $t_{trs}(2)$/°C= 180, 209, 216 (Ref. 2).

ESTIMATED ERROR:

Temperature: accuracy probably ±2 K (compiler).

REFERENCES:

(1) Sokolov, N.M.
Zh. Obshch. Khim. 1954, 24, 1581-1593.
(2) Sokolov, N.M.
Tezisy Dokl. X Nauch. Konf. S.M.I. 1956.