

405. *The Two-component Salt Mixtures of Lead Nitrate with Thallium or Silver Nitrate.*

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FREEZING-POINT data for the binary systems $\text{Pb}(\text{NO}_3)_2$ - TlNO_3 and $\text{Pb}(\text{NO}_3)_2$ - AgNO_3 have not hitherto been investigated.

Pure AgNO_3 was recryst. from HNO_3 , fused, and ground to a fine powder. TlNO_3 , prep. by dissolving Tl_2CO_3 in HNO_3 , was recryst. thrice. The purification of $\text{Pb}(\text{NO}_3)_2$ and the methods used in determining f. p.'s are described in an earlier paper (this vol., p. 874).

TABLE I.

Freezing points of mixtures containing $\text{Pb}(\text{NO}_3)_2$.

[Compositions are expressed as % of $\text{Pb}(\text{NO}_3)_2$ by wt.]

<i>Series I.</i> $\text{Pb}(\text{NO}_3)_2$ with AgNO_3 .				<i>Series II.</i> $\text{Pb}(\text{NO}_3)_2$ with TlNO_3 .			
$\text{Pb}(\text{NO}_3)_2$, %	F. p.	$\text{Pb}(\text{NO}_3)_2$, %	F. p.	$\text{Pb}(\text{NO}_3)_2$, %	F. p.	$\text{Pb}(\text{NO}_3)_2$, %	F. p.
0.0	209.5°	12.0	230.9°	0.0	206.2°	16.0	185.5°
2.5	208.2	15.0	249.8	2.5	203.1	17.0	192.6
5.0	205.4	20.0	278.7	5.0	197.8	20.0	214.2
7.5	201.2	25.0	302.2	7.5	192.0	25.0	247.1
(E ₁) 8.5	200.2	30.0	323.6	10.0	186.0	30.0	279.1
9.0	206.2	35.0	342.5	12.0	181.3	35.0	306.9
10.0	215.7	40.0	359.3	13.0	179.1	40.0	335.6
11.0	223.3			14.0	176.9	45.0	357.1
				(E ₂) 14.7	175.5	50.0	378.0
				15.0	177.0		

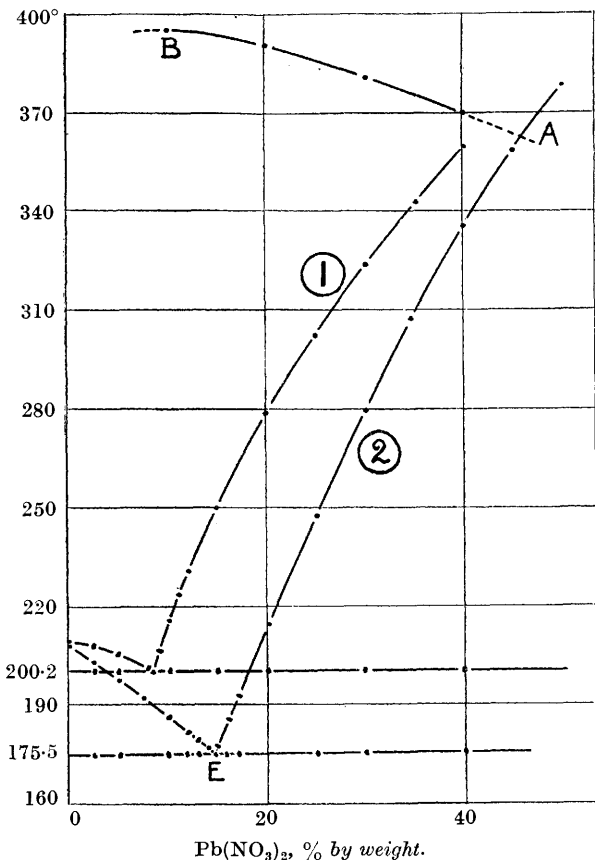
E₁ and E₂ = Eutectic compositions.

The results (Table I and Fig. 1) show that each system is of the simple eutectic type within the limits of comp. indicated. Decomp. of $\text{Pb}(\text{NO}_3)_2$

limits investigation to mixtures containing 50% TlNO_3 (f. p. 378.0°) and 60% AgNO_3 (f. p. 359.3°) in the respective systems. The existence of limiting mixtures in these two systems is analogous to the behaviour of $\text{Pb}(\text{NO}_3)_2$ in KNO_3 or NaNO_3 (*loc. cit.*), and the relation between decomp. temp. and comp.

FIG. 1.

Freezing point-composition diagrams for the systems $\text{Pb}(\text{NO}_3)_2$ - AgNO_3 and $\text{Pb}(\text{NO}_3)_2$ - TlNO_3 , with a decomposition temperature-composition diagram for the system $\text{Pb}(\text{NO}_3)_2$ - TlNO_3 .



- (1) System $\text{Pb}(\text{NO}_3)_2$ - AgNO_3 .
 (2) System $\text{Pb}(\text{NO}_3)_2$ - TlNO_3 .

has been found to be similar in type in the system TlNO_3 - $\text{Pb}(\text{NO}_3)_2$ to that in the systems $\text{Pb}(\text{NO}_3)_2$ - KNO_3 and $\text{Pb}(\text{NO}_3)_2$ - NaNO_3 .

The rise in decomp. temp. with decrease of $\text{Pb}(\text{NO}_3)_2$ content is shown in Fig. 1 (AB) and the intersection of BA with the f. p. curve EA defines the limiting mixture. The deflexion of AB in the neighbourhood of B is caused

by the decomp. of TiNO_3 , which occurs at 380° with the pure salt (cf. Thomas, *Compt. rend.*, 1904, **138**, 1697, who reports vigorous decomp. at 450° , with evolution of nitrous fumes).

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[Received, September 30th, 1932.]
