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TEMPERATURE-COMPOSITION DIAGRAMS
OF PSEUDO-BINARY SYSTEMS
CONTAINING PLUTONIUM(III) HALIDES

LOS ALAMOS NATIONAL LABORATORY



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OF THE UNIVERSITY OF CALIFORNIA LOS ALAMOS NEW MEXICO

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TEMPERATURE-COMPOSITION DIAGRAMS
OF PSEUDO-BINARY SYSTEMS
CONTAINING PLUTONIUM(III) HALIDES

Compiled by

J. A. Leary

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ABSTRACT

Temperature composition diagrams are presented for the systems $\text{PuF}_3\text{-LiF}$, $\text{PuF}_3\text{-NaF}$, $\text{PuCl}_3\text{-LiCl}$, $\text{PuCl}_3\text{-NaCl}$, $\text{PuCl}_3\text{-KCl}$, $\text{PuCl}_3\text{-RbCl}$, $\text{PuCl}_3\text{-CsCl}$, $\text{PuCl}_3\text{-MgCl}_2$, $\text{PuCl}_3\text{-CaCl}_2$, $\text{PuCl}_3\text{-SrCl}_2$, and $\text{PuCl}_3\text{-BaCl}_2$.

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FOREWORD

The following temperature-composition diagrams were constructed from the literature cited in the references. The two plutonium(III) fluoride diagrams were reported in The Journal of Inorganic and Nuclear Chemistry by workers at Oak Ridge National Laboratory, and are included in this compilation with the permission of the authors. All of the plutonium(III) chloride diagrams have been reported in the Journal of Physical Chemistry by workers at Los Alamos Scientific Laboratory. The diagrams have been compiled in this report for convenient reference.

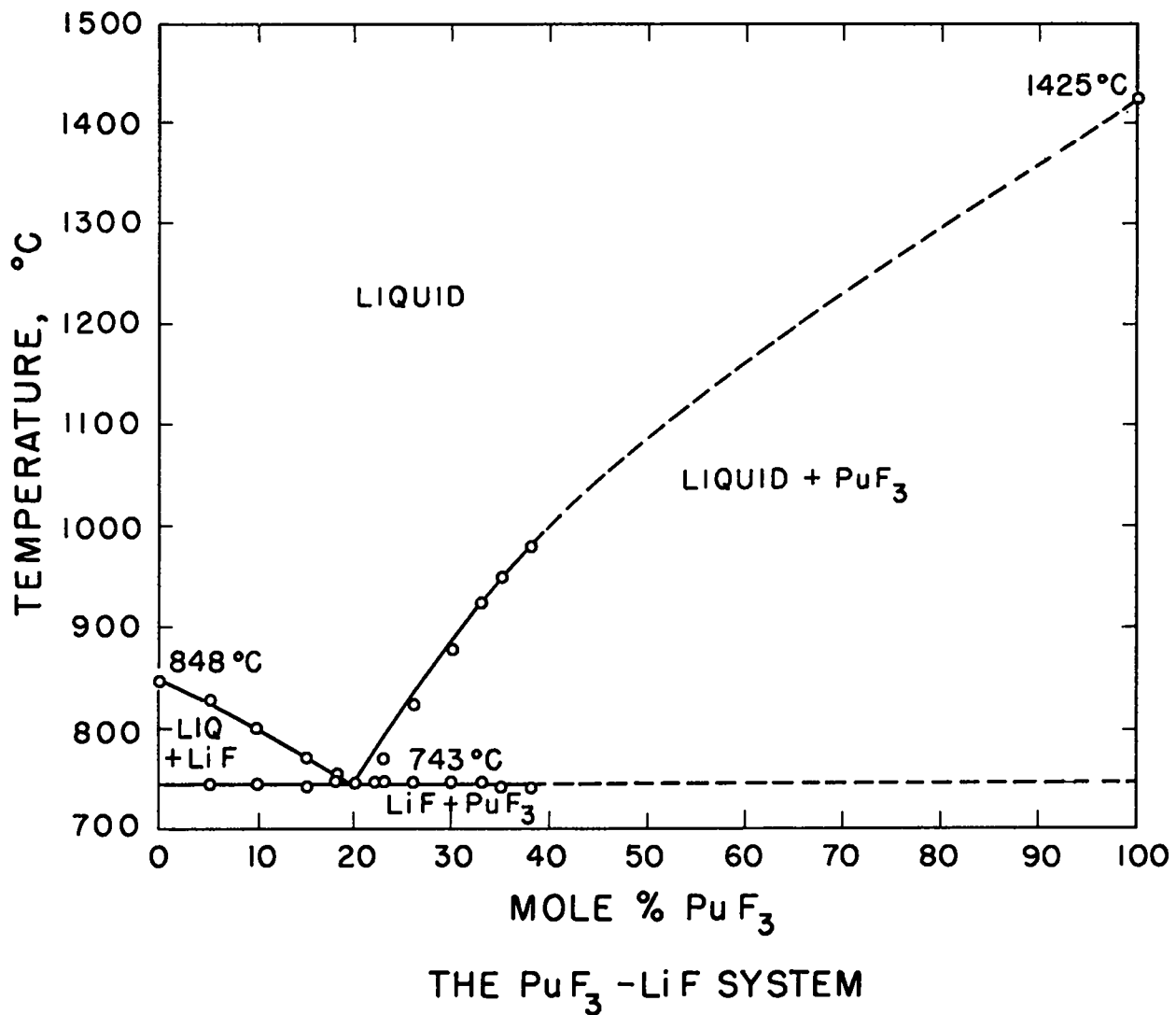


Fig. 1 (reference 1)
 Eutectic point at 743°, 19.5 percent PuF₃
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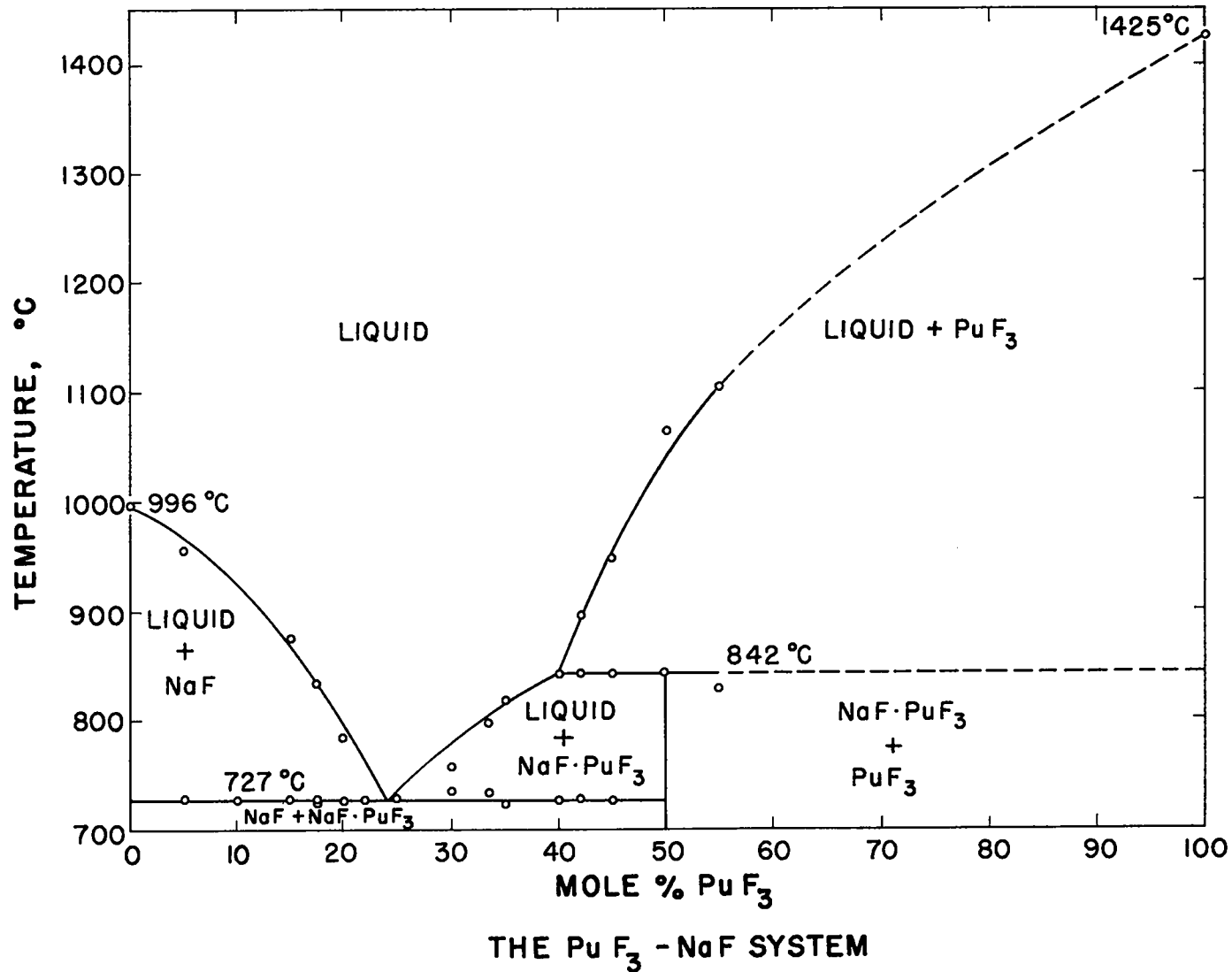


Fig. 2 (reference 2)
 Eutectic point at 727°, 24 percent PuF_3
 Peritectic point at 842°, 40 percent PuF_3
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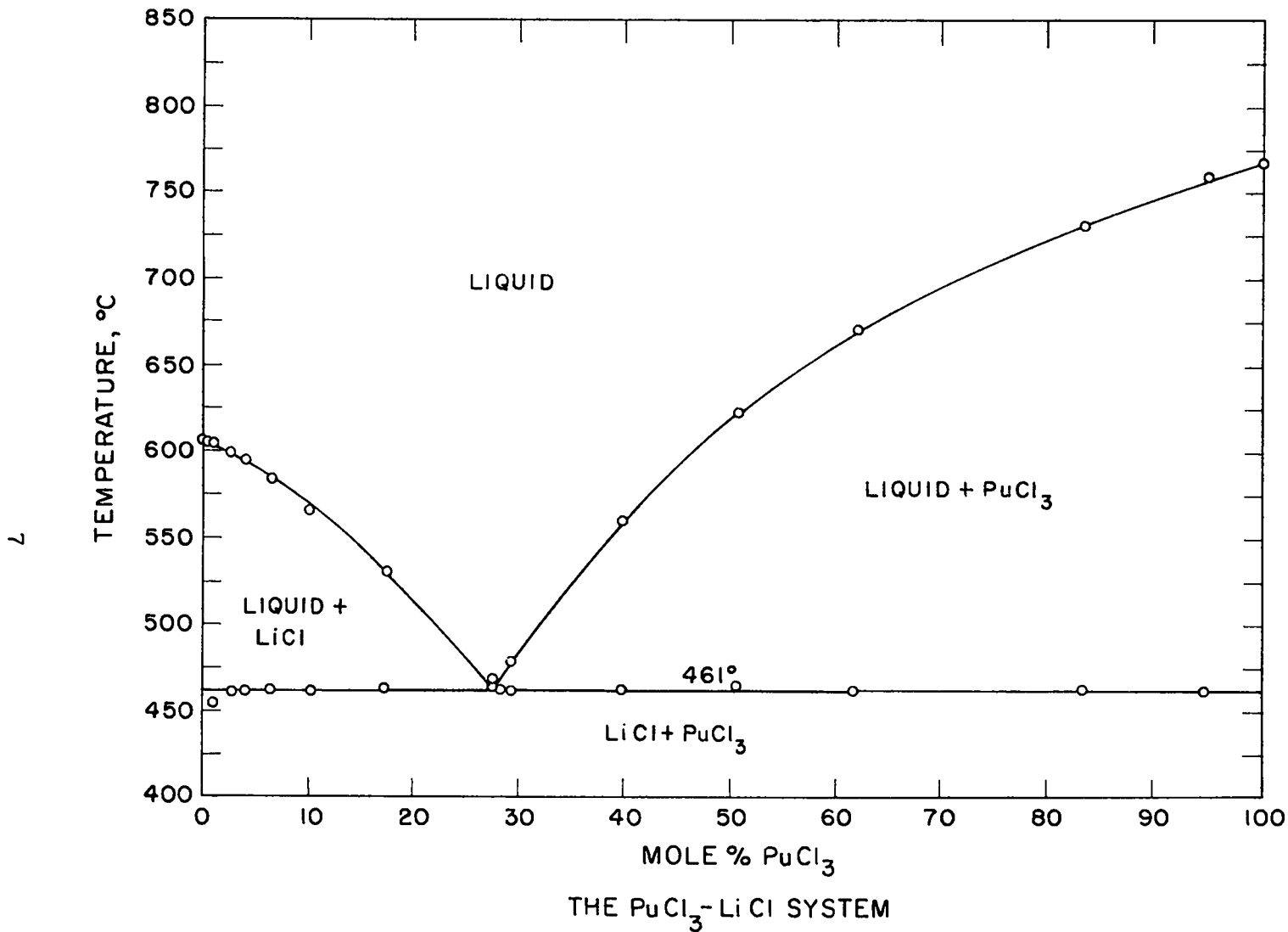


Fig. 3 (reference 3)
 Eutectic point at 461°, 28 percent PuCl₃
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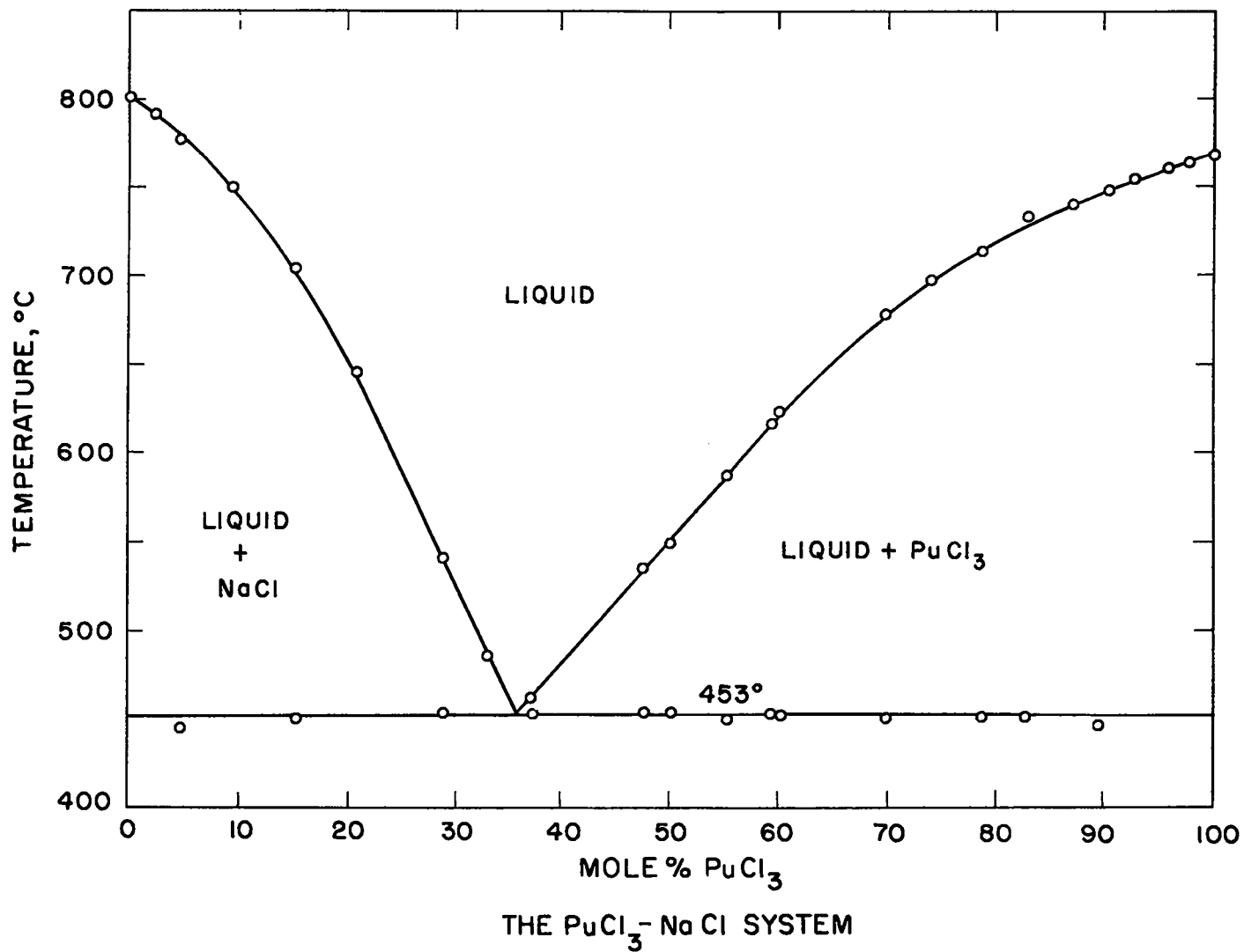


Fig. 4 (reference 3)
Eutectic point at 453°, 36 percent PuCl_3
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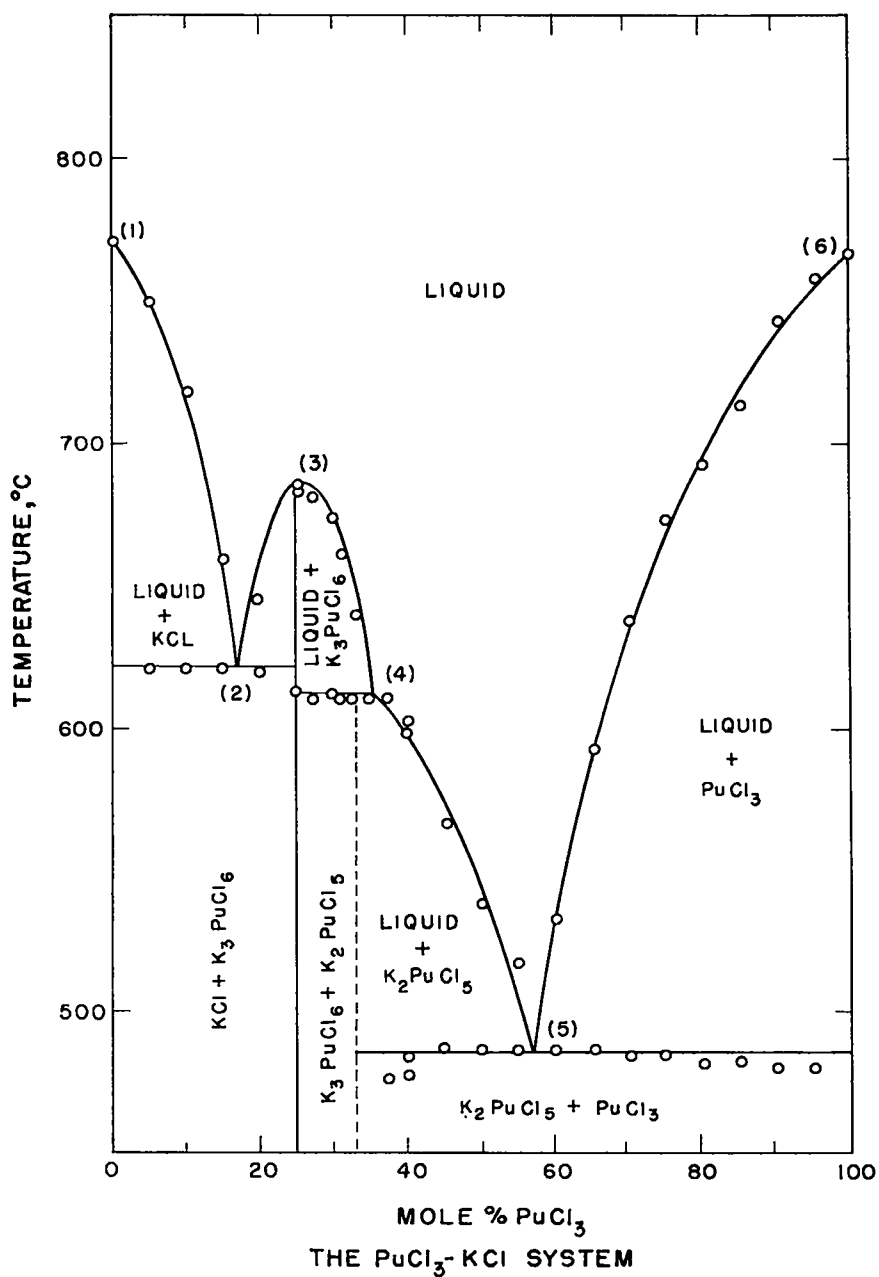


Fig. 5 (reference 4)

- (1) KCl melting point, 771°
- (2) Eutectic point at 621°, 17 percent PuCl₃
- (3) K₃PuCl₆ melting point, 685°
- (4) Peritectic point at 611°, 35 percent PuCl₃
- (5) Eutectic point at 486°, 57 percent PuCl₃
- (6) PuCl₃ melting point, 769°

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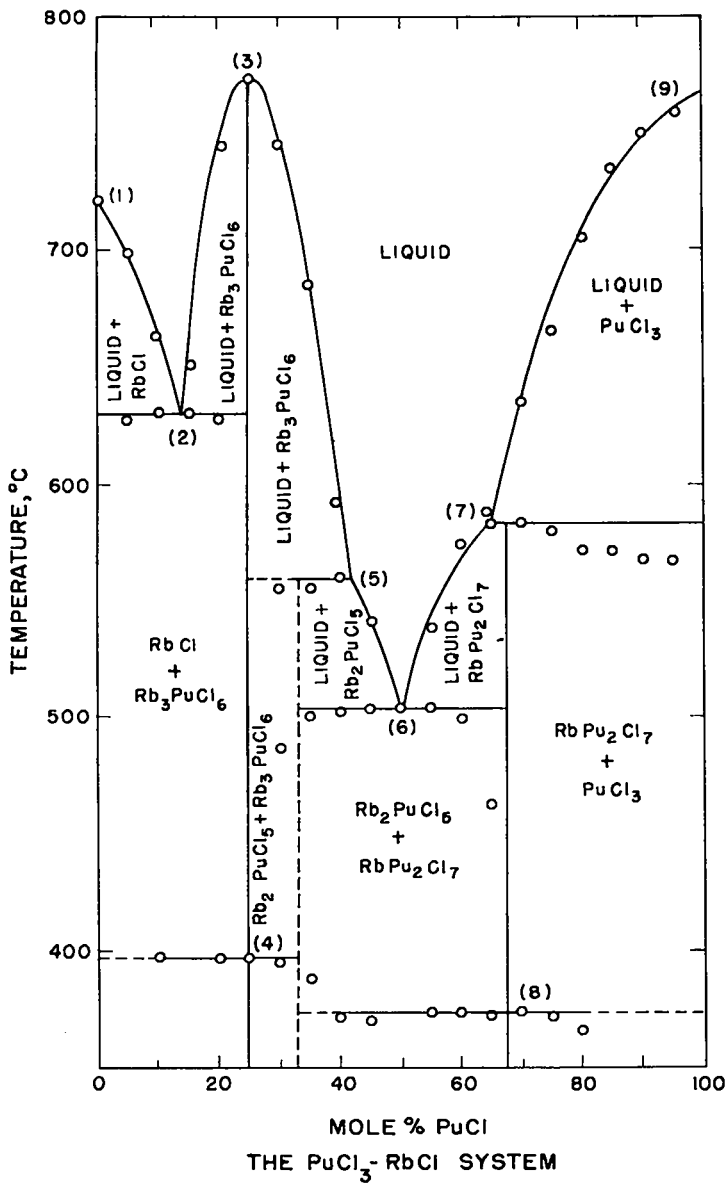


Fig. 6 (reference 5)

- (1) RbCl melting point, 721°
 - (2) Eutectic point at 630° , 14 percent PuCl_3
 - (3) Rb_3PuCl_6 melting point, 774°
 - (4) Rb_3PuCl_6 polymorphic transformation, 398°
 - (5) Peritectic point at 560° , 42 percent PuCl_3
 - (6) Eutectic point at 304° , 50 percent PuCl_3
 - (7) Peritectic point at 584° , 64 percent PuCl_3
 - (8) RbPu_2Cl_7 polymorphic transformation, 374°
 - (9) PuCl_3 melting point, 769°
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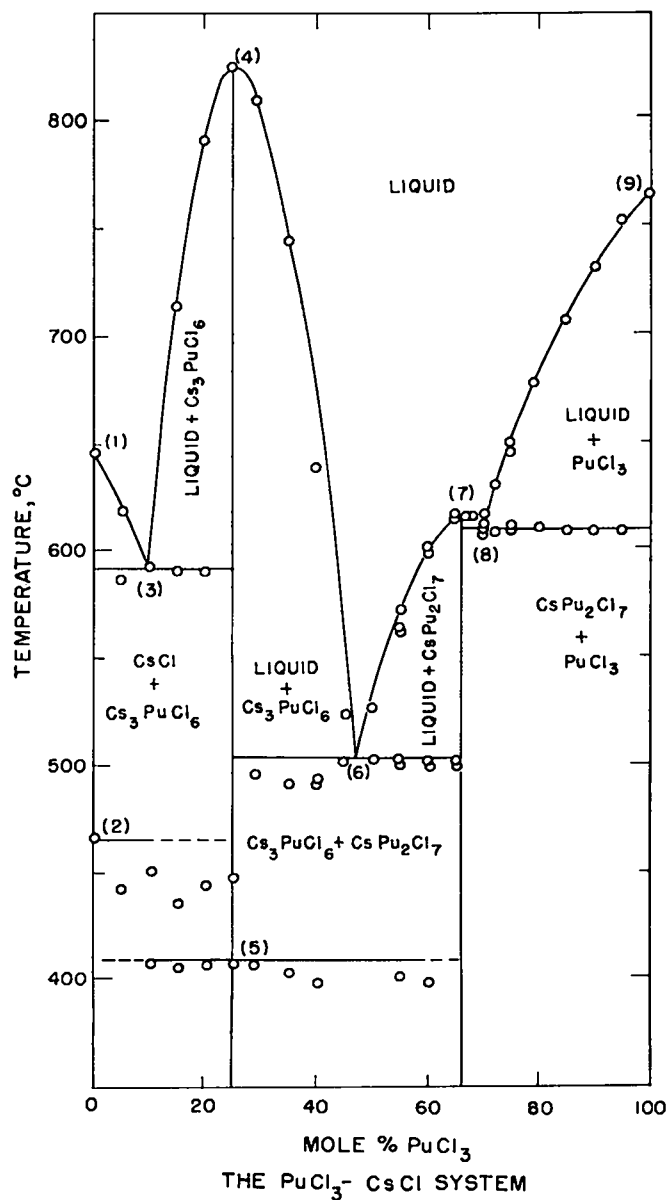


Fig. 7 (reference 5)

- (1) CsCl melting point, 645°
 - (2) CsCl polymorphic transformation, 465°
 - (3) Eutectic point at 592°, 10 percent PuCl₃
 - (4) Cs₃PuCl₆ melting point, 825°
 - (5) Cs₃PuCl₆ polymorphic transformation, 410°
 - (6) Eutectic point at 504°, 47 percent PuCl₃
 - (7) CsPu₂Cl₇ melting point, 616°
 - (8) Eutectic point at 611°, 70 percent PuCl₃
 - (9) PuCl₃ melting point, 769°
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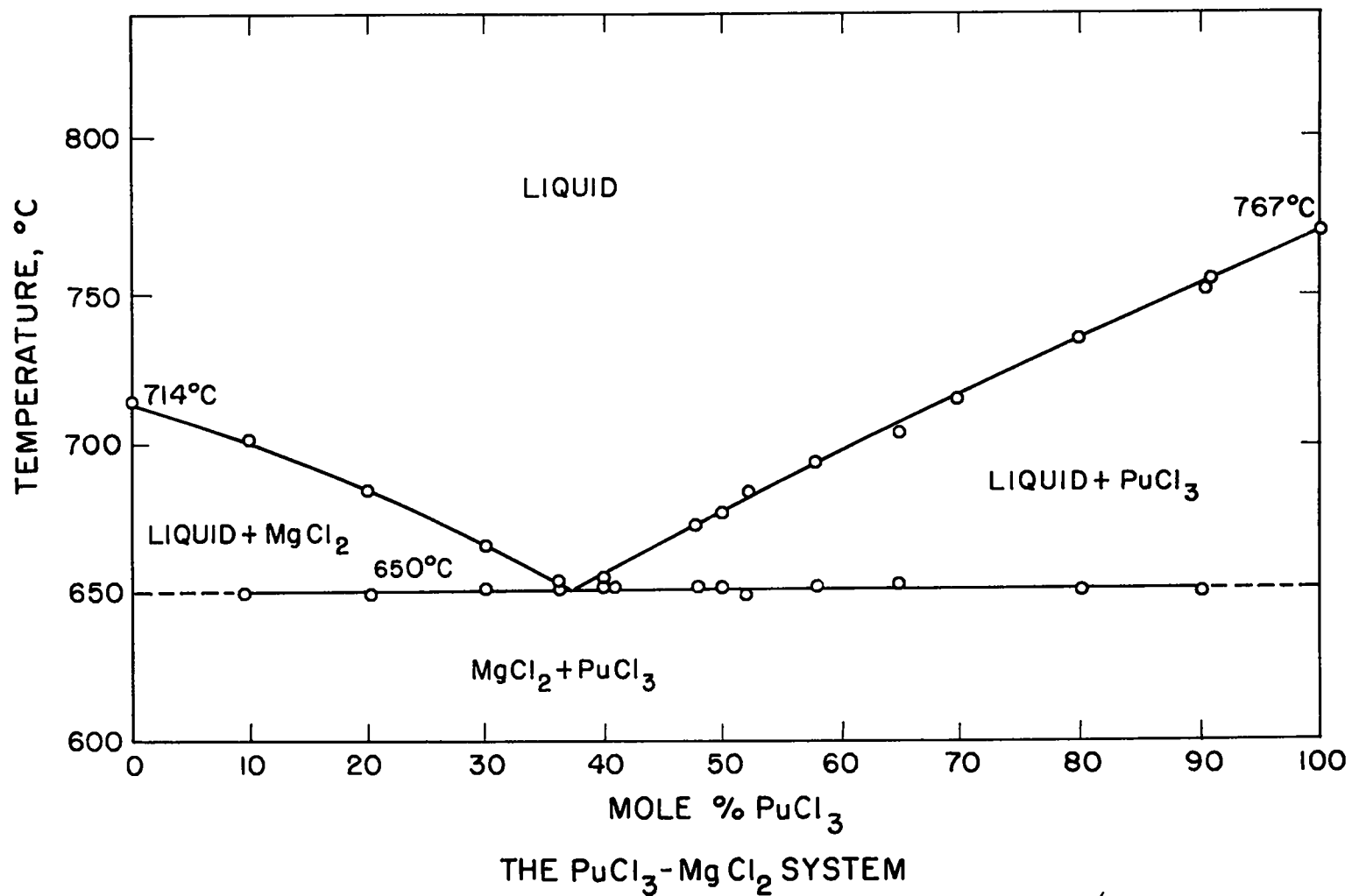


Fig. 8 (reference 6)
Eutectic point at 650°, 38 percent PuCl_3
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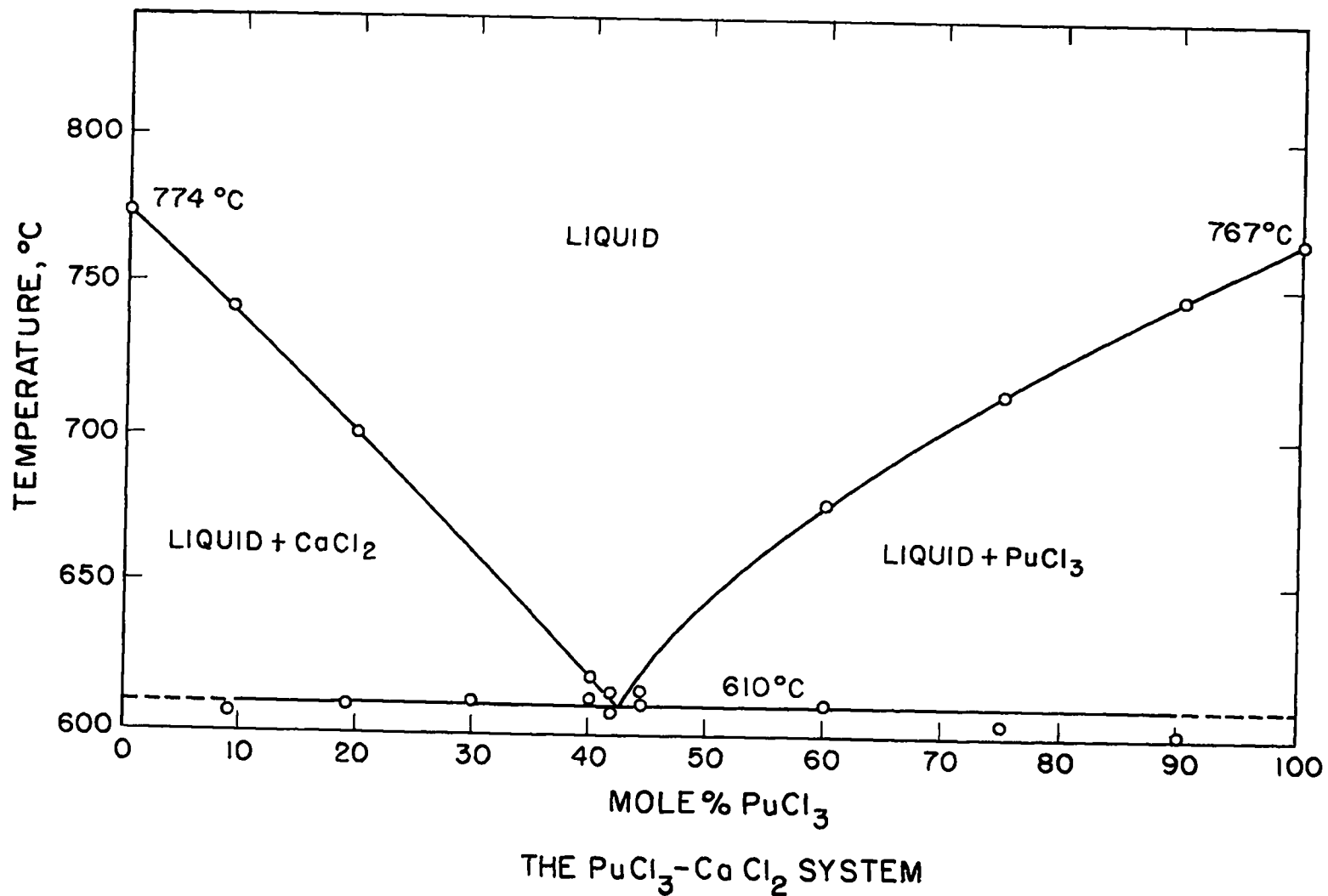


Fig. 9 (reference 6)
Eutectic point at 610°, 43 percent PuCl_3
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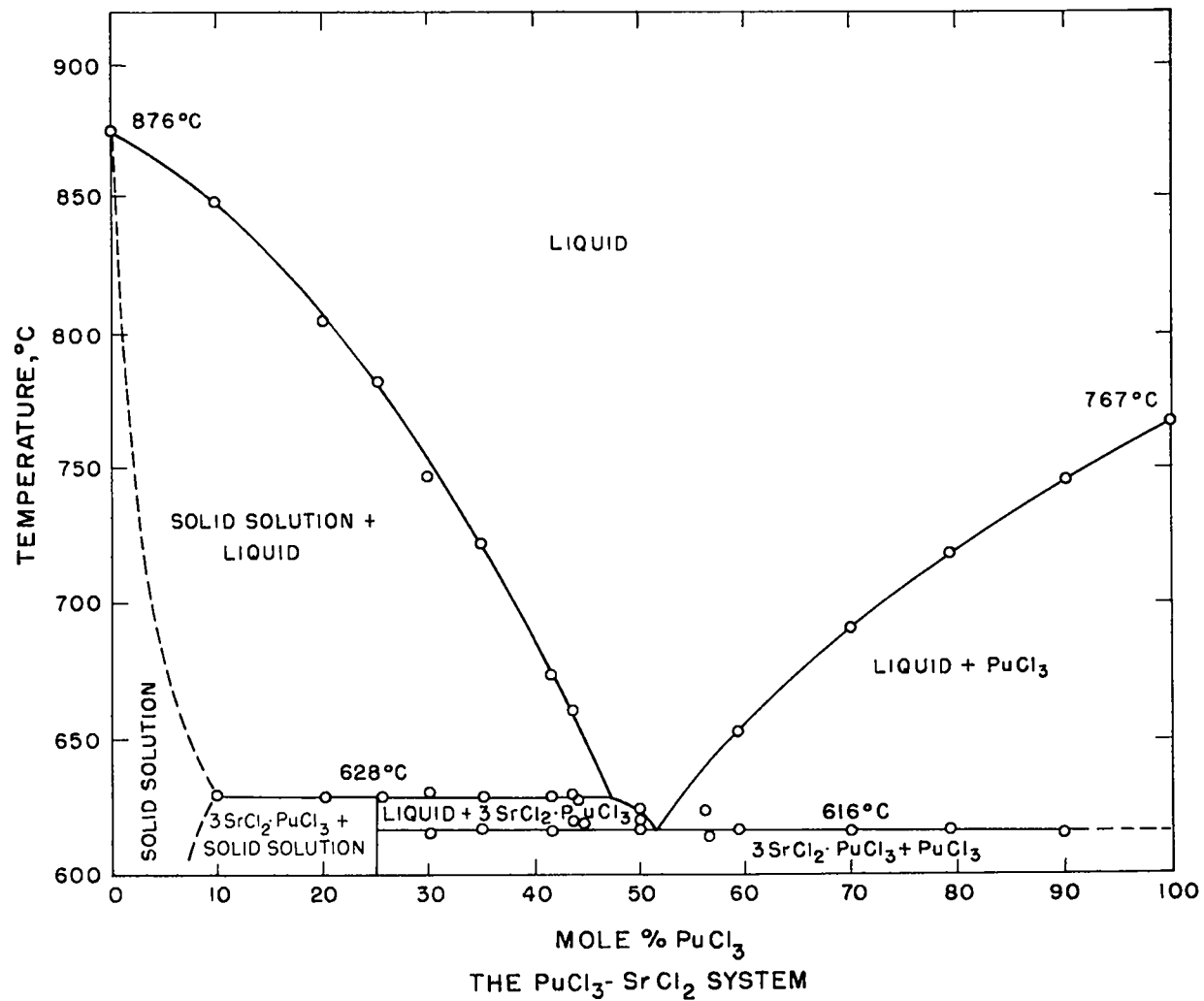


Fig. 10 (reference 6)
 Peritectic point at 628°, 47 percent PuCl₃
 Eutectic point at 616°, 52 percent PuCl₃
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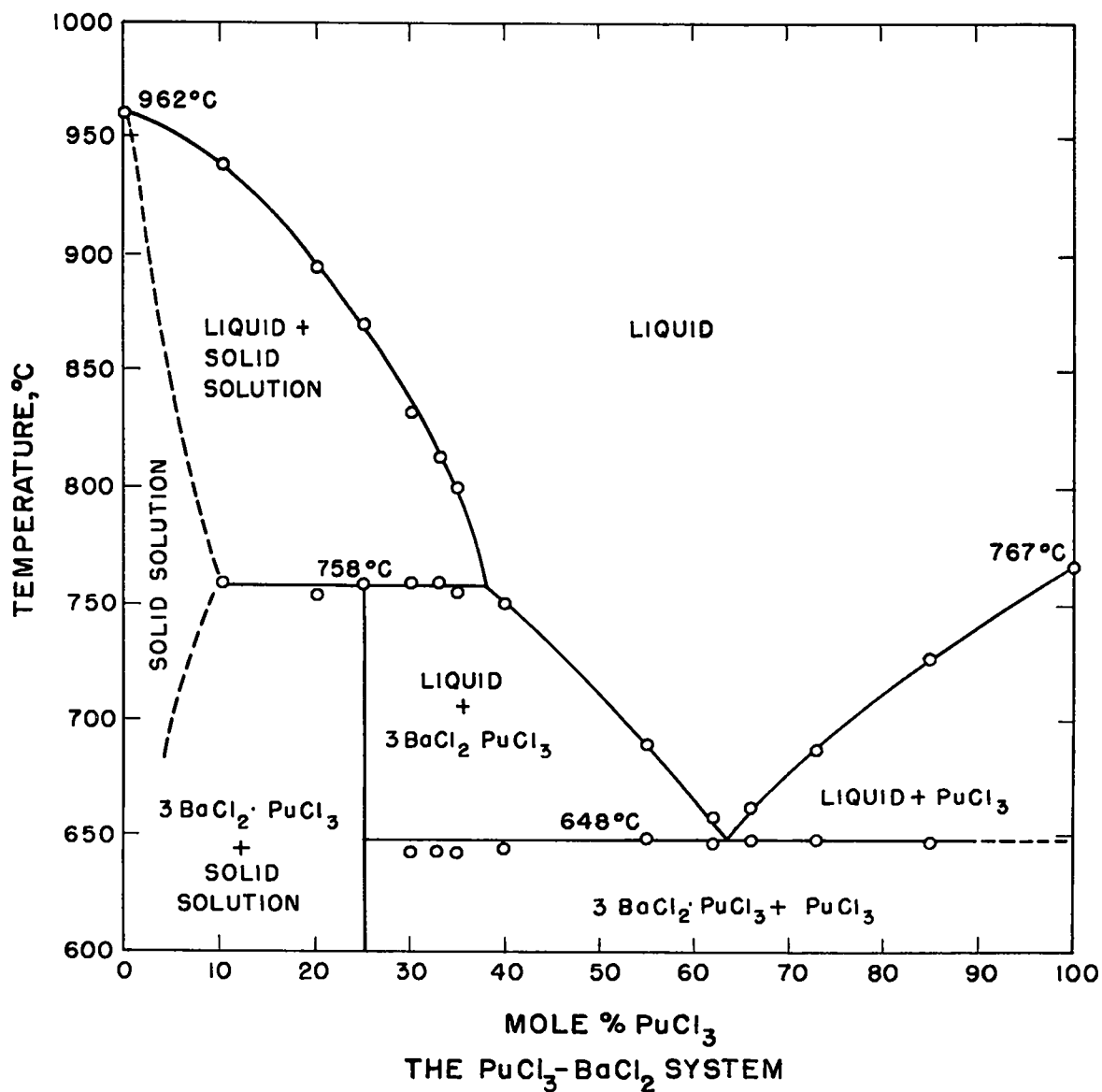


Fig. 11 (reference 6)
 Peritectic point at 758°, 38 percent PuCl_3
 Eutectic point at 648°, 64 percent PuCl_3
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