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Aluminum-Magnesium-Silicon Ternary Alloy Phase Diagram (based on 1986 Lüdecke D.)

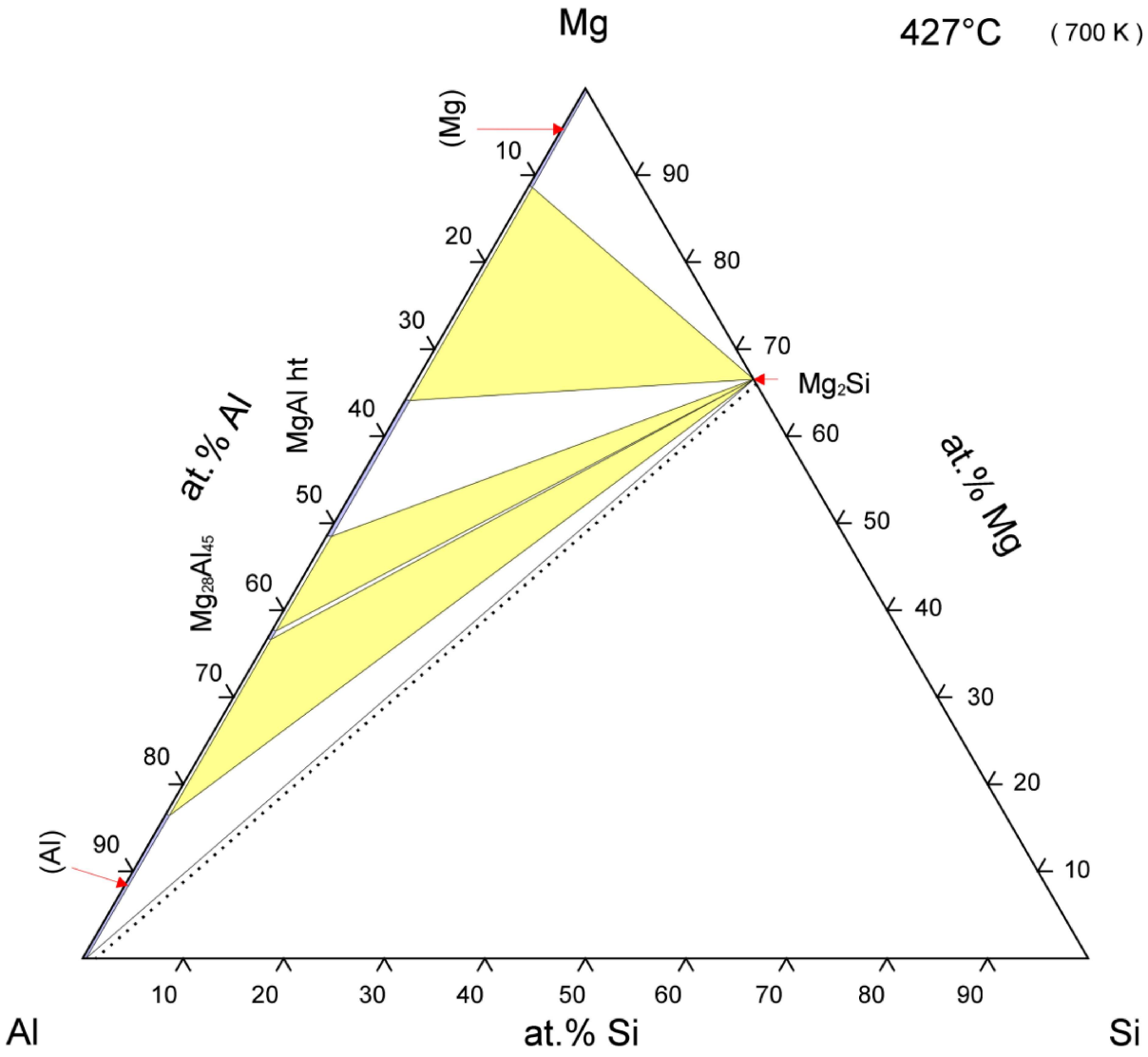

 Diagram No. 976032

Publication Year	1986 [1]
Diagram type	ternary, isothermal section
Concentration range	partial composition; Al-Mg-Mg_2Si
Temperature	427 °C
Nature of investigation	calculated
APDIC diagram	No

Unique ID No.	976032
Title	Phase Diagram and Thermochemistry of the Al-Mg-Si System
Publication	Z. Metallkd.
Language	English
Authors	Lüdecke D., Aachen RWTH University, Lehrstuhl für Metallurgie der Kernbrennstoffe und Theoretische Hüttenkunde, Aachen, Germany
Original diagram	Al-Mg-Si isothermal section at 427 °C
Original scope	Al conc.[0-100 at.%] vs. Mg conc.[0/66.7-100 at.%] vs. Si conc.[0-33.3 at.%]
Original size	0.7
Remarks	

Crystal data for the complete system

APD phase label / Published phase label	Formula	Prototype	Pearson symbol / Space group	Density Mg/m^3 / Volume nm^3	Cell parameters nm	Cell parameters °	Ref
Phases shown in this diagram:							
(Al) α	Al	Cu	cF4 Fm-3m	2.7 0.0664	a=0.40497 b=0.40497 c=0.40497 T=295 K	α=90 β=90 γ=90	[2]
(Mg) Mg	Mg	Mg	hP2 $P6_3/mmc$	1.74 0.0466	a=0.32125 b=0.32125 c=0.52132 T=295 K	α=90 β=90 γ=120	[3]
MgAl ht		(no data)					
$Mg_{28}Al_{45}$ β	$Mg_{28}Al_{45}$	$Mg_{28}Al_{45}$	cF1832 Fd-3m	2.24 22.5189	a=2.8239 b=2.8239 c=2.8239 T=296(1) K	α=90 β=90 γ=90	[8]
Mg_2Si Mg_2Si	Mg_2Si	CaF_2	cF12 Fm-3m	1.99 0.25617	a=0.6351 b=0.6351 c=0.6351	α=90 β=90 γ=90	[9]
Phases shown in other Al-Mg-Si diagrams:							
(Si)	Si	C	cF8 Fd-3m	2.33 0.1603	a=0.5432 b=0.5432 c=0.5432	α=90 β=90 γ=90	[4]
$Mg_{17}Al_{12}$	$Mg_{17}Al_{12}$	$Mg_{17}Al_{12}$	cI58 I-43m	2.09 1.1722	a=1.05438 b=1.05438 c=1.05438	α=90 β=90 γ=90	[5]
$Mg_{23}Al_{30}$ ht	$Mg_{23}Al_{30}$	$Mg_{23}Al_{30}$	hR159 R-3	2.2 3.09805	a=1.28254 b=1.28254 c=2.17478	α=90 β=90 γ=120	[6]
$Mg_{1.2}Al_{1.8}$ m1	$Mg_{1.2}Al_{1.8}$	$MgNi_2$	hP24 $P6_3/mmc$	1.9 0.54252	a=0.573 b=0.573 c=1.908	α=90 β=90 γ=120	[7]
$Mg_{1.2}Al_{1.8}$ m2	$Mg_{1.2}Al_{1.8}$	$MgZn_2$	hP12 $P6_3/mmc$	1.9 0.27126	a=0.573 b=0.573 c=0.954	α=90 β=90 γ=120	[7]
MgSi rt		(no data)					

Pure metal melting points and allotropic transformations

Element phase	Common name	Reaction	Temperature, °C	Prototype	Pearson symbol	Space group
(Al)	αAl	L ↔ (Al)	660.452	Cu	cF4	Fm-3m
(Mg)	Mg	L ↔ (Mg)	650	Mg	hP2	$P6_3/mmc$
(Si)	αSi	L ↔ (Si)	1414	C	cF8	Fd-3m

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For definition of terms and additional phase diagrams information, view the Help pages at www.asminternational.org/AsmEnterprise/APD

ASM Alloy Phase Diagrams Center, P. Villars, editor-in-chief; H. Okamoto and K. Cenzual, section editors; http://www.asminternational.org/AsmEnterprise/APD, ASM International, Materials Park, OH, USA, 2007