

L2: Chemical Aspects – Lecture Slides

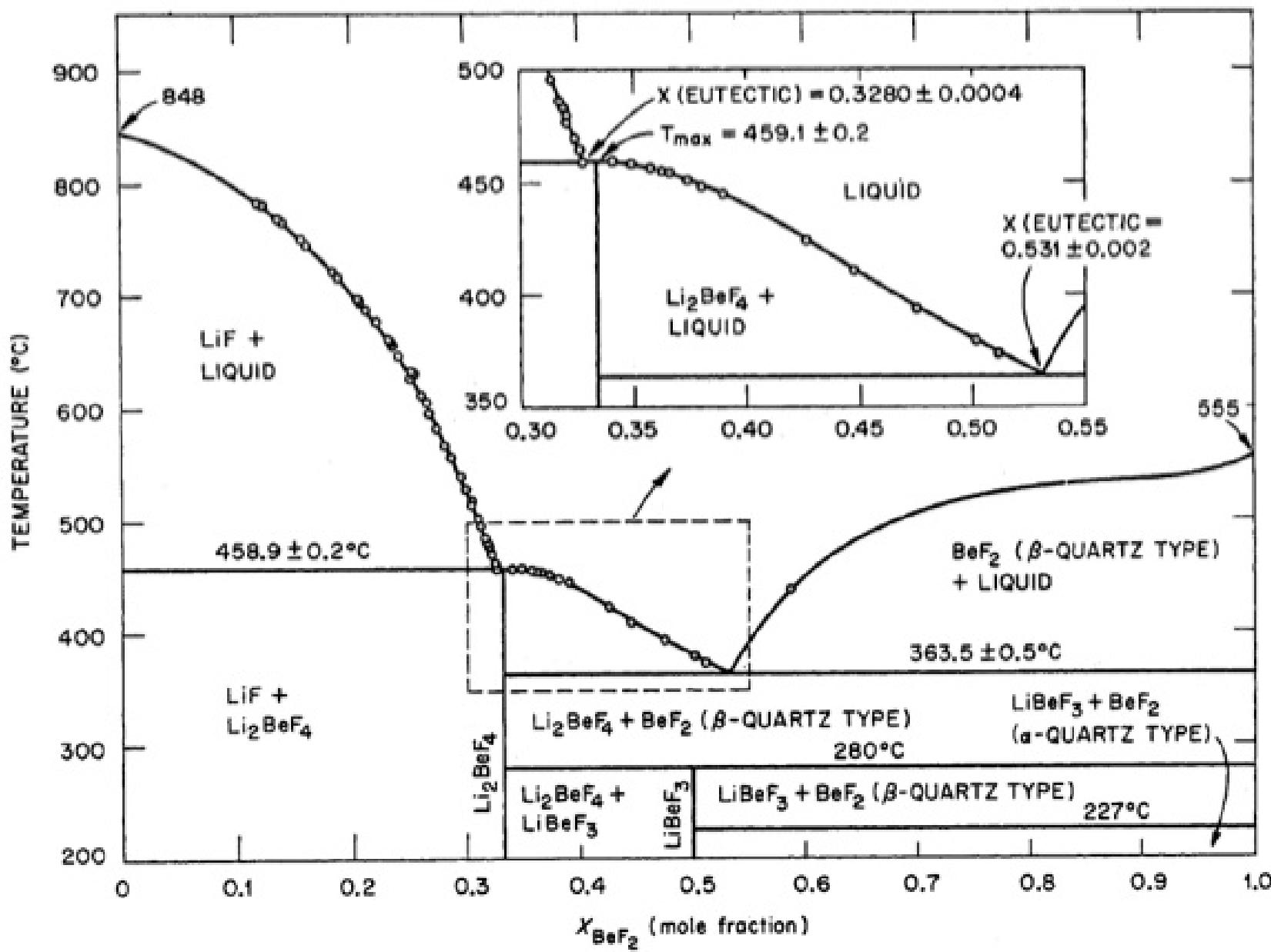
23 Jan. 2017

hydrogen 1 H 1.0079															helium 2 He 4.0026			
lithium 3 Li 6.941	beryllium 4 Be 9.0122														neon 10 Ne 20.180			
sodium 11 Na 22.990	magnesium 12 Mg 24.305														argon 18 Ar 39.948			
potassium 19 K 39.098	calcium 20 Ca 40.078														krypton 36 Kr 83.80			
rubidium 37 Rb 85.468	strontium 38 Sr 87.62														xenon 54 Xe 131.29			
caesium 55 Cs 132.91	barium 56 Ba 137.33	57-70	lutetium 71 Lu 174.97	hafnium 72 Hf 178.49	tantalum 73 Ta 180.95	tungsten 74 W 183.84	rhenium 75 Re 186.21	osmium 76 Os 186.21	iridium 77 Ir 190.23	platinum 78 Pt 192.22	gold 79 Au 195.08	mercury 80 Hg 196.97	thallium 81 Tl 200.59	lead 82 Pb 204.38	bismuth 83 Bi 207.2	polonium 84 Po 208.98	astatine 85 At [209]	radon 86 Rn [210]
francium 87 Fr [223]	radium 88 Ra [226]	89-102	lawrencium 103 Lr [262]	rutherfordium 104 Rf [261]	dubnium 105 Db [262]	seaborgium 106 Sg [266]	bohrium 107 Bh [264]	hassium 108 Hs [269]	meitnerium 109 Mt [268]	ununnilium 110 Uun [271]	unununium 111 Uuu [272]	ununbium 112 Uub [277]	ununquadium 114 Uuq [289]					

* Lanthanide series

** Actinide series

lanthanum 57 La 138.91	cerium 58 Ce 140.12	praseodymium 59 Pr 140.91	neodymium 60 Nd 144.24	promethium 61 Pm [145]	samarium 62 Sm 150.36	europerium 63 Eu 151.96	gadolinium 64 Gd 157.25	terbium 65 Tb 158.93	dysprosium 66 Dy 162.50	holmium 67 Ho 164.93	erbium 68 Er 167.26	thulium 69 Tm 168.93	ytterbium 70 Yb 173.04
actinium 89 Ac [227]	thorium 90 Th 232.04	protactinium 91 Pa 231.04	uranium 92 U 238.03	neptunium 93 Np [237]	plutonium 94 Pu [244]	americium 95 Am [243]	curium 96 Cm [247]	berkelium 97 Bk [247]	californium 98 Cf [251]	einsteinium 99 Es [252]	fermium 100 Fm [257]	mendelevium 101 Md [258]	nobelium 102 No [259]



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sodium 11 Na 22.990		magnesium 12 Mg 24.305
potassium 19 K 39.098		calcium 20 Ca 40.078
rubidium 37 Rb 85.466		strontium 38 Sr 87.63
caesium 55 Cs 132.91		barium 56 Ba 137.33
francium 87 Fr [223]		radium 88 Ra [226]

* Lanthanide series

** Actinide series

lanthanum 57	cerium 58	praseodymium 59	neodymium 60	promethium 61	samarium 62	euroium 63	gadolinium 64	terbium 65	dysprosium 66	holmium 67	erbium 68	thulium 69	ytterbium 70
La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb
138.91	149.12	140.91	144.24	[145]	150.36	151.96	157.25	158.93	162.50	164.93	167.26	168.93	173.04
actinium 89	thorium 90	protactinium 91	uranium 92	neptunium 93	plutonium 94	americium 95	curium 96	berkelium 97	californium 98	einsteinium 99	fermium 100	mendelevium 101	nobelium 102
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No
[227]	232.04		[238.03]	[237]	[244]	[243]	[247]	[247]	[251]	[251]	[257]	[258]	[259]

Th F₄- soluble

UF_4/UF_3 - soluble; UF_6 - volatile
 PuF_3 - soluble

PbI_3 - soluble

carrier gas options
are deposited on walls
RuF₅ volatile, C. red
 $2\text{NF}_4, \text{AlF}_3, \text{BF}_2$
applicable vap. press
 $\propto T < 700^\circ\text{C}$

noble gases

					helium
boron	carbon	nitrogen	oxygen	fluorine	neon
5 B 10.811	6 C 12.011	7 N 14.007	8 O 15.999	9 F 18.998	10 Ne 20.180
aluminum	silicon	phosphorus	sulfur	chlorine	argon
13 Al 10.723	14 Si 28.086	15 P 30.974	16 S 32.065	17 Cl 35.453	18 Ar 39.948
gallium	germanium	arsenic	selenium	bromine	krypton
31 Ga 69.723	32 Ge 72.61	33 As 74.922	34 Se 78.96	35 Br 79.904	36 Kr 83.80
indium	tin	antimony	tellurium	iodine	xenon
49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.60	53 I 126.90	54 Xe 131.30
thallium	lead	bismuth	polonium	astatine	radon
81 Tl 204.38	82 Pb 207.2	83 Bi 208.98	84 Po [209]	85 At [210]	86 Rn [222]
	ununquadium				
	114 Uuq [289]				

Rare- Factors