

Uorganisk kemi

14 1
Ø2

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1

Grundstoffernes periodiske system

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

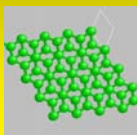
H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac															

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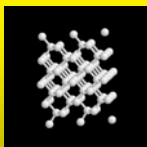
C

- Grafit



(lærebog fig 12.22)

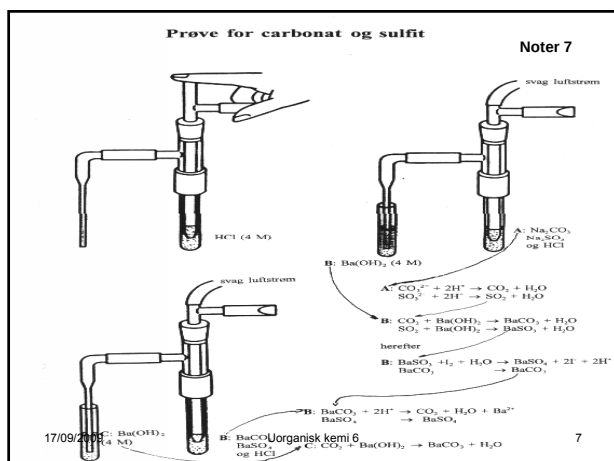
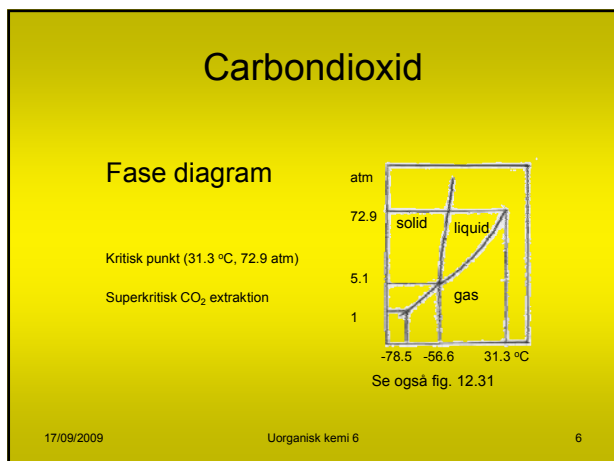
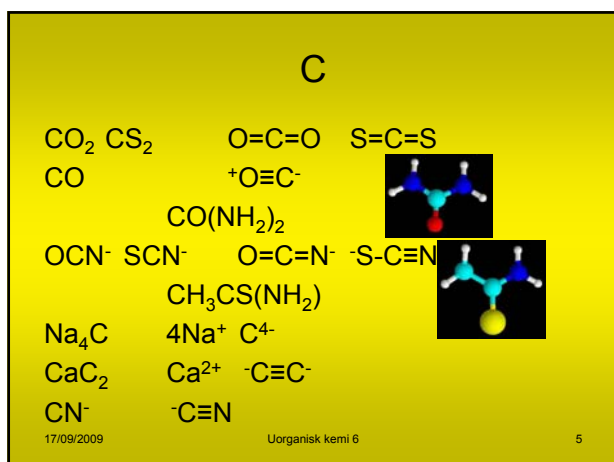
- Diamant



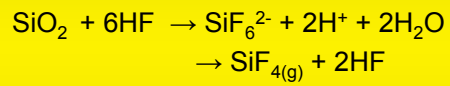
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Si



Glas-tilstand

Glasætsning – mønstre og opvasker

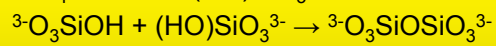
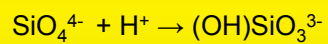
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Silikater

SiO_4 - tetraeder



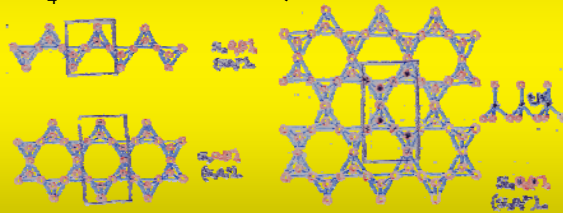
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Silikat mineraler

SiO_4 - tetraeder

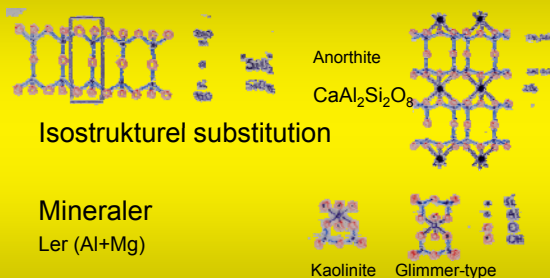


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Silikater, glimmer, lerminerale



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Ge, Sn, Pb ?

- Ge stort set som Si
- Tin og bly er mest metaller
øvelse 4

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Alkalimetaller

- Elektropositive metaller

Noter 24

oxider spaltet ved opvarmning	oxider reduceres af metaller af hydrogen	oxider reduceres ikke af metaller af hydrogen
Au Pt Pd Ag Hg	Cu Bi As Sb Sn Pb	Pb Sn Ni Co Cd Fe Er Zn Mn Al Mg Na Ca Sr Ba K
danner kun oxider i vand		
danner hydrogen med syrer		
danner oxider med oxygen		
danner hydrogen med varm vanddamp (evt. under tryk)		
danner hydrogen med vand		
danner oxider med oxygen		

Oxidation

Reduktion

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	Li	Na	K	Rb	Cs	Noter 45
Forekomst %	.007	2.8	2.6	.03	7·10 ⁻⁴	
Smeltepunkt/°C	180	98	63	39	29	
Densitet/g·cm ⁻³	0.534	0.968	.856	1.532	1.87	
Ionisations-energi/kJ·mol ⁻¹	517	493	416	401	373	
	7263	4540	3054	2650	2270	
Atomradius/Å	1.52	1.86	2.31	2.44	2.62	
E°/V	-3.02	-2.71	-2.92	-2.99	-3.02	
Hydratiserings-enthalpi M ⁺ /kJ·mol ⁻¹	-515	-406	-322	-293	-264	
Ionradius for M ⁺ ·r/Å	0.60	0.98	1.33	1.48	1.74	
Ion potentiale (q/r)	1.67	1.05	0.75	0.68	0.57	
Ionmobilitet /10 ⁶ m ² s ⁻¹ V ⁻¹	4.0	5.2	7.6	8.1	8.1	
Flammefarve	rød	gul	blåviolet	rød		
Lewis-syre	hård	hård	hård	hård	hård	14

Atomradius

Chapter 12.4: Crystal structures

- Alkalimetal: BCC 8:8



- Na

$$4r = \sqrt{3} \cdot a$$

$$a^3 = \frac{M_{Na}}{d_{Na} \cdot N_A} \cdot 2 \cdot Na - \text{atomer} \cdot \text{enhedscelle}$$

$$a = \sqrt[3]{\frac{23.09 \cdot \text{g/Na}}{\text{molNa}} \cdot \frac{\text{cm}^3}{0.968 \cdot \text{g/Na}} \cdot \frac{\text{molNa}}{6.022 \cdot 10^{23} \cdot \text{Na} - \text{atomer}} \cdot \frac{2 \cdot Na - \text{atomer}}{\text{enhedscelle}} \cdot \left(\frac{10^8 \text{ Å}}{\text{cm}} \right)^3}$$

$$r = 1.857 \text{ Å}$$

Sammenlign fig. 8.4 (1.86 Å)

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Li, Na, K

- Letopløselige salte.
- Identifikation:
 - Li₃PO₄
 - NaSb(OH)₆ skurestriber (H⁺, Li⁺ !)
 - K₂Na[Co(NO₂)₆] orange (NH₄⁺)

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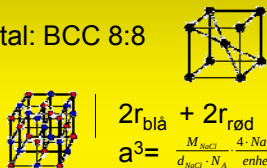
Krystallinske stoffer

Chapter 12.4: Crystal structures

- Alkalimetall: BCC 8:8

- CsCl

- NaCl



$$2r_{\text{blå}} + 2r_{\text{rød}} = a$$

$$a^3 = \frac{M_{\text{NaCl}}}{d_{\text{NaCl}} \cdot N_A} \cdot \frac{4 \cdot \text{NaCl} - \text{enh}}{\text{enhedscele}} \quad (\text{se fig. 12.21})$$

$$a = \sqrt[3]{\frac{58.44 \cdot \text{gNaCl}}{\text{molNaCl}} \cdot \frac{\text{cm}^3}{2.165 \cdot \text{gNaCl}} \cdot \frac{\text{molNaCl}}{6.022 \cdot 10^{23} \cdot \text{NaCl} - \text{enh}} \cdot \frac{4 \cdot \text{NaCl} - \text{enh}}{\text{enhedscele}} \left(\frac{10^8 \text{ Å}}{\text{cm}} \right)^3}$$

$$r_{\text{blå}} + r_{\text{rød}} = 2.82 \text{ Å}$$

Sammenlign fig. 8.8 (0.98 Å + 1.81 Å)

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Krystalopbygning af salte

CsCl

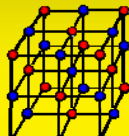
MgO

ZnS



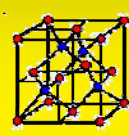
8:8

$$r_{\text{Cs}}/r_{\text{Cl}} > 0.732$$



6:6

$$r_{\text{Mg}}/r_{\text{O}} > 0.414$$



4:4

$$r_{\text{Zn}}/r_{\text{S}} > 0.225$$

Se fig 12.20 og 12.21

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