

Øvingsoppgaver materialteknologi

Kapittel 12 & 13 Løsningsforsslag

a)

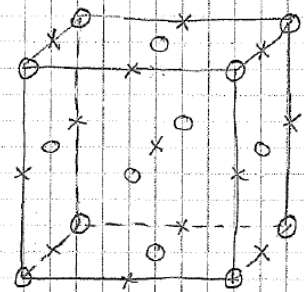
Eksamen TMT 4185, Materialteknologi 12 des. 2006.

Solutions 3

Sec Callister p. 420

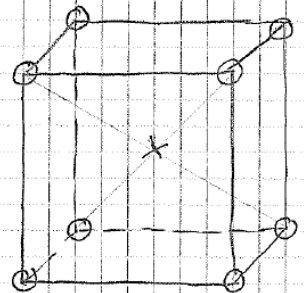
(a)

NaCl



x : Na 6-coordination
o : Cl 6-coordination

CsCl

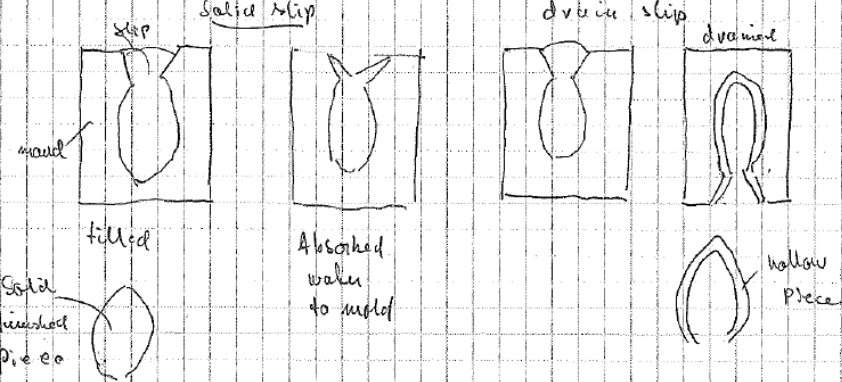


x : Cs 8-coordination
o : Cl 8-coordination

(b) Slip casting

Sec Callister p 420

Solid slip



filled

Solid finished piece

Absorbed water to mold

drain slip

drained

hollow piece

- c) Frenkel defect: Cation leaving original position, moving into interstitial. No change in stoichiometry. Callister p. 434-436
Schottky defect: cation vacancy - anion vacancy pair. No change in stoichiometry
Single vacancy: Change in stoichiometry - change in valency
Single interstitial: Change in stoichiometry - change in valency
- d) A glass ceramic is a fine-grained polycrystalline ceramic material which is formed as a glass and subsequently heat treated to crystallize. Callister p. 462, 476
- e) Fracture strength is determined by materials flaws (cracks, inclusions etc) There is a higher probability that a large sample contains a flaw than a small sample.
- f) Thermal tempering of glass is made by heating the glass above the glass transition but below the softening temperature and cooling to room temperature in a jet of air. Results in compressive stress in the surface. This stress prevents cracks from propagating.
See page 475 and fig 13.10 in Callister.