UNIVERSITÄT SIEGEN
FESTKÖRPERPHYSIK

3. Homework 3D-lattice, 3D-lattice planes, crystal morphology

1. Draw the reciprocal basis vector, {**a*, b*, c*} (**in any projection)**,** for the 3D-lattice, which has the following lattice constants:

a) a = b = c = 3.56 A, α=β=γ=90 deg (***Diamond***)
b) a=7.42 A, b=5.73 A, c=10.01 A, α=β=γ=90 deg (***Potassium Sulphate***)
c) a=b=4.9 A, c=5.4 A α=β=90 deg, γ=120 deg ***(α-Quartz***)

and calculate the reciprocal lattice constants.

2. Find the distance between lattice planes having the following Miller indices in Diamond und α-Quartz crystal (see exercise 1):
a) (100)
b) (120)
c) (112)

3. Please calculate the Miller indices of plane, which intersects the three points of the lattice?
a) 400, 020, 007
b) -100, 0∞0, 005
c) 200, 040, 006
How many planes located between the origin point (0 0 0) and this plane?

4. Calculate the angle between the crystal planes in the following α-Quartz crystal
a) (100) and (010)
b) (100) and (101)
c) (101) and (011)