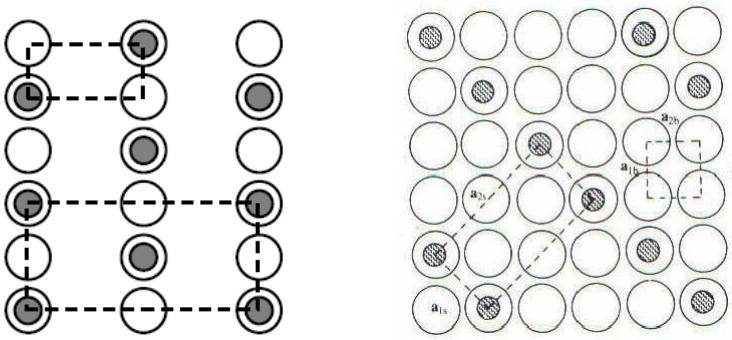
Übungen zur Oberflächenphysik

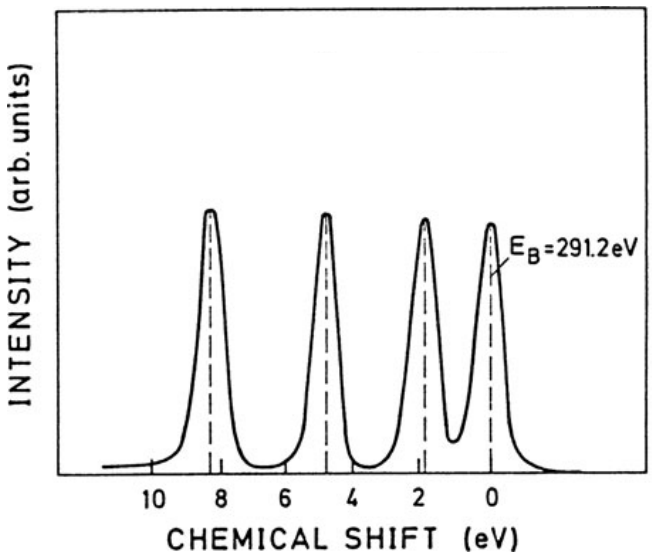
Blatt 2 – 20.03.2012

1) Titanium sublimation pump
   a. Calculate the performance of a titanium sublimation pump. Assume that it consists of a cylindrical recipient with 35 cm diameter. At 30 cm of its height, titanium is evaporated onto the walls. The recipient is connected to the main chamber via a metal tube of 35 cm diameter and 20 cm length.
   b. At what pressures does it make sense to use this type of pump? Explain.

2) Calculate the matrix of the superstructures – left: O on Ni(110), right: O on Pt(100) – drawn below and specify the Wood notation.



3) XPS and AES
   a. Although AES is an element-specific surface spectroscopy technique, why can't it detect elemental H and He? Explain schematically.
   b. The figure below shows the XPS C1s spectrum of $CF_3CO_2C_2H_5$. Assign the four different peaks to the corresponding carbon atoms.
   c. Briefly describe how you can measure the thickness of e. g. thiolate self-assembled monolayers (SAMs) on a gold substrate.



4) Draw the diffraction pattern...

a. ... of the c(2x2) oxygen reconstruction on the Co(001) substrate

b. ... of the structure shown below. The substrate is a (111)-face. How does the diffraction pattern look qualitatively if the different domains contribute equally to the pattern?