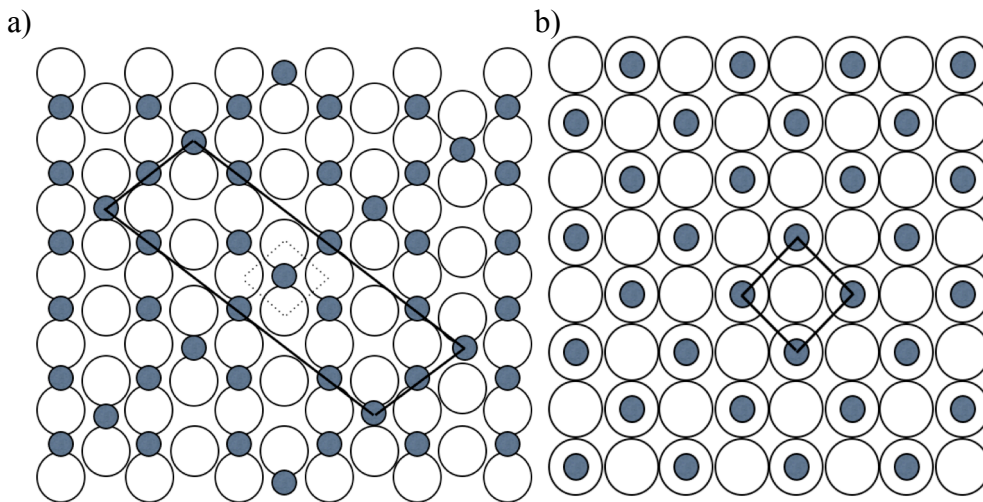


## Übungen zur Oberflächenphysik Blatt 2 – 19.3.2013

### 1) Titanium sublimation pump

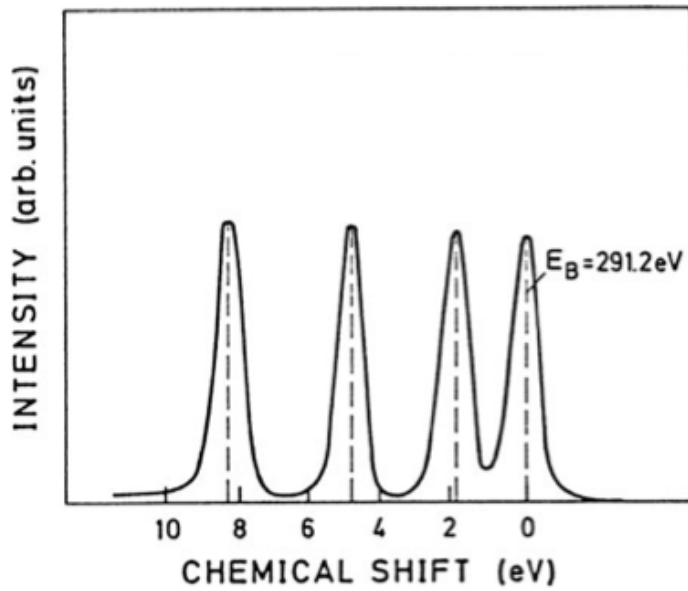
- a.) Calculate the performance of a titanium sublimation pump. Assume that it consists of a cylindrical recipient with 35 cm diameter. At 30 cm of its height, titanium is evaporated onto the walls. The recipient is connected to the main chamber via a metal tube of 35 cm diameter and 20 cm length.
-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

- 2) Calculate the matrix of the superstructures – a) BCC (110), b) FCC(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  $\text{CF}_3\text{CO}_2\text{C}_2\text{H}_5$ . 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 of the LEED...

- a.) ... of the  $c(2 \times 2)$  S reconstruction on the Ni(100) 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?

