Tfy-3.468 Surface Physics

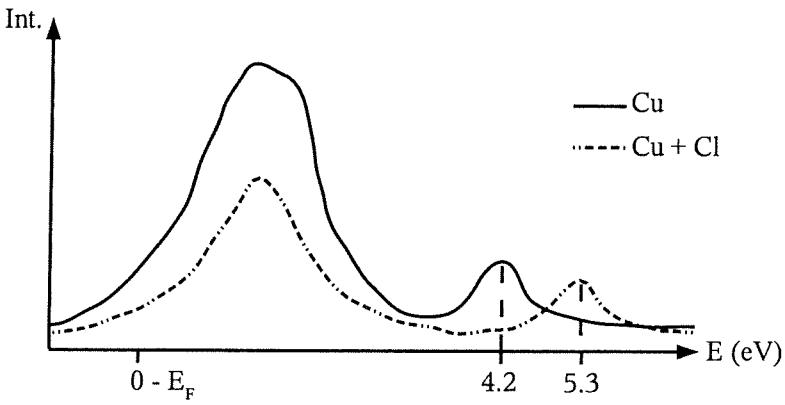
Examination 15.12.2003

1. Explain shortly what are the following surface science techniques and why they are surface sensitive
   a) ARUPS
   b) LEIS
   c) AFM

2. Draw the following surface structures
   a) Pt(100)-(2×4)-CO
   b) Ru(0001)-(√3×√3)R30°-CO

3. a) Explain what an I-V curve represents in LEED experiments and how it can be measured.
   b) Why are experimental peaks in an I-V plot generally shifted from predictions using a free electron model of the surface?

4. The figure shows an inverse photoemission spectrum from the clean and Cl covered Cu surface.
   a) Explain shortly how these measurements can be done.
   b) For the clean surface, explain what the two peaks represent. What is significant about the shift of the smaller peak upon adsorption of Cl?



5. The ammonia synthesis is one of the most studied surface reactions.
   a) Write and name the individual reaction steps involved in the reaction on a catalyst surface.
   b) What information has been obtained from the reaction with surface sensitive methods?