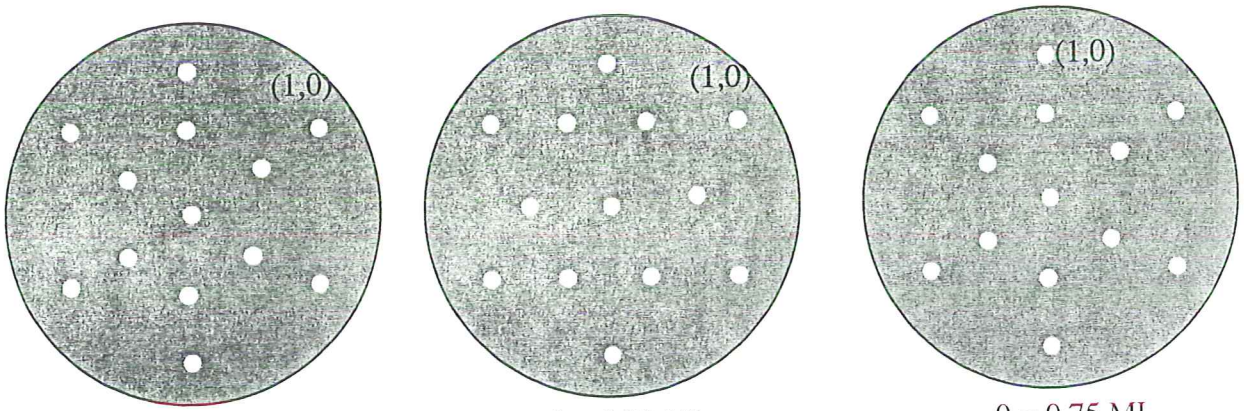
Tfy-3.468 Surface Physics

Examination

Aug - 2008

1. Explain shortly what does the following abbreviations mean in surface science
   a) AFM
   b) EELS
   c) SEXAFS
   d) SIMS
   e) TDS
   f) UPS

1. The adjacent LEED images were recorded with different coverages of CO on Rh(111) surface. Name and draw the surface structures of the CO overlayer. The lattice parameter of Rh is 3.80 Å and Rh is an fcc metal.

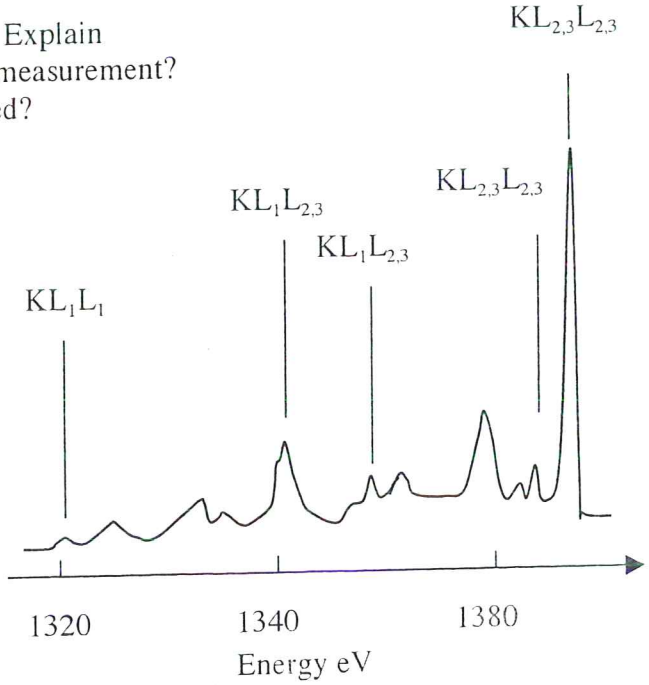


θ = 0.25 ML θ = 0.33 ML θ = 0.75 ML

3. Adsorption of 0.25 ML of sulfur on Ni(100) leads to a work function increase of 0.24 eV. Estimate the direction and degree of charge transfer between sulfur and nickel. The S-Ni distance has been determined to 1.3 Å. The lattice parameter of Ni is 3.51 Å and Ni is an fcc metal.

4. XPS is a well-known surface sensitive technique. Explain
   a) What equipment is needed to perform a XPS measurement?
   b) What is the physical origin of the data obtained?
   c) Why is this technique surface sensitive?

5. Below is measured the Auger spectrum of an Aluminum surface.
   a) Draw the schematic picture of one of the peaks showing the electrons involved in the process.
   b) At what energy you can see surface plasmons?
   c) What is the frequency of the surface plasmons?



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