

Material for exam

Exam will be comprehensive, here you will find some questions to guide your study.

See questions suggested for Fall 2011 exam [here](#) .

See the 2011 exam [here](#), the 2010 exam [here](#), and the 2007 exam [here](#).

Older questions (from Fall 2010):

Auger spectroscopy

- Meaning of transition nomenclature, eg. what is a KLL transition?
- What is the maximum depth of AES?
- Can Auger electrons be non-core electrons?
- Why is AES a more qualitative than quantitative technique?
- What pressure is best when performing an AES measurement?
- Can the Auger electron emission process be initiated with x-rays?
- Besides the beam electrons, how many electrons are involved in AES?
- Is the kinetic energy of the Auger electrons dependent on the beam energy?
- Do sample charging change the kinetic energy of the Auger electrons?
- What are the typical beam energies used in AES?
- Do sample charging and environmental shifts refer to the same effect in AES?
- Do environmental shifts and chemical shifts refer to the same effect in AES?
- Can photoelectrons be emitted during an AES measurement?
- What does Auger sensitivity refers to?
- Does the Auger sensitivity depend on the electron beam energy?
- What does the background of an Auger spectrum is composed of?
- Why are Auger spectra broader than XPS spectra?
- Why is the AES uses dN/dE instead of $N(E)$ directly?
- Can there be an Auger electron emission without the emission of a photoelectron?
- Can He emit Auger electrons?
- What is the role of the electron multiplier in the AES equipment?

X-ray photoelectron spectroscopy

- Can x-rays eject non-core electrons?
- What is the maximum depth of XPS?
- Why is XPS a more qualitative than quantitative technique?
- How many electrons are involved in XPS?
- What pressure is best when performing an XPS measurement?
- Is the kinetic energy of the photoelectron dependent on the X-ray beam energy?
- Do sample charging change the kinetic energy of the photoelectrons?
- What are the typical x-ray beam energies used in XPS?
- Do sample charging and environmental shifts refer to the same effect in XPS?
- Do environmental shifts and chemical shifts refer to the same effect in XPS?
- Can Auger electrons be emitted during an XPS measurement?
- Why is the XPS does not use dN/dE instead of $N(E)$?
- What does x-ray photoelectron sensitivity refers to?
- Does the x-ray photoelectron sensitivity depend on the x-ray beam energy?
- What does the background of an XPS spectrum is composed of?
- Can there be photoelectron emission without the emission of an Auger electron?
- Can XPS be used to identify hydrogen?
- Is there a need for an electron multiplier in the XPS equipment?