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Master I Sciences Alimentaires **Anglais Scientifique** **2021-2022**

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Cours n° 01

1. Passages for comprehension:

a) Optical characterization of CuIn1-xGaxSe2 alloy thin films by spectroscopic ellipsometry Optical constants of polycrystalline thin film CuIn1-xGaxSe2 alloys with $Ga/(Ga + In)$ ratios from 0 to 1 have been determined by spectroscopic ellipsometry over an energy range of 0.75–4.6 eV. CuIn1-xGaxSe2 films were deposited by simultaneous thermal evaporation of elemental copper, indium, gallium and selenium. X-ray diffraction measurements show that CuIn1-xGaxSe2 films are single phase. Due to their high surface roughness, the films are generally not suitable for ellipsometer measurements. A method is presented in which spectroscopic ellipsometer measurements were carried out on the reverse side of the CuIn1-xGaxSe2 films immediately after peeling them from Mo-coated soda lime glass substrates. A detailed description of multilayer optical modeling of ellipsometric data, generic to ternary chalcopyrite films, is presented. Accurate values of the refractive index and extinction coefficient were obtained and the effects of varying Ga concentrations on the electronic transitions are presented.

Questions:

1. What does happen if we change x value from 0 to 1 in CuIn1-xGaxSe2 alloy?

2. What does “single phase” mean?

3. What is the purpose of the presented technique?

4. Why CuIn1-xGaxSe2 films are generally not suitable for ellipsometer measurements?

5. Were the optical constants obtained values accurate?