SS 2013

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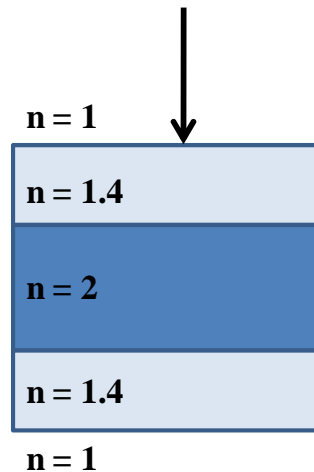Chair for general materials science

Exercises "Advanced materials B"

#10

Exercise 10: Optical system

Consider the following sandwich structure composed of materials with refraction index 1.4 and 2:

1. Considering normal incidence of light, calculate the reflectance in every interface of the structure. Ignore backscattering effects.

2. Considering no backscattering effects and zero absorption, which percentage of light is transmitted?

3. If the angle of incidence of light is 45° with respect to the normal, calculate the angle of the light beam after each interface.

4. If the material with n= 1.4 has an absorption coefficient of 3230 cm^{-1}, and a thickness of 100 nm, which percentage of light enters the material with n = 2 (consider the reflectances)?

5. Considering that the average energy of the light is **3x10^{-19} J**, and that the optical power is **600 W/m^2**, estimate the flux of electrons Φ_e (1/cm^{2}s) in the material with n = 2 if it is photoactive and has an efficiency of 0.2. Consider the result of question 4.