Advanced Topics on Spectroscopy 2020 report 6

1. He-Ne laser and Ar ion laser all line were observed by a CCD + polychromator system. A number of the CCD channels is 1024 ch. He-Ne was detected at 227 ch and Ar ion all line was observed at 621, 710, 748 and 810 ch. Deduce an equation which convert channel(CH(ch)) into wavelength by first order of wavelength(λ (nm)) equation, $\lambda = a\mathrm{CH} + \lambda_\mathrm{a}$ where, significant figure of a and λ_a must be 4. You should find oscillating wavelength of He-Ne and Ar ion lasers by yourself from web or etc...

2. A file "2020_observed results.txt" gives observation results of standard lamp and PL from a sample by the CCD+Polychromator system. In the file, the 1st, 2nd and 3rd columns show channel of CCD, observed result of standard lamp and PL, respectively. A file "2020_standard lamp true value.txt" gives correct spectrum of a standard lamp. In the file the 1st and 2nd columns show wavelength(nm) and correct spectrum of the standard lamp.

(1) Draw graph sensitivity (=measured value/true value) against to wavelength (nm). Drawing range (horizontal axis) of the compensation curve should be 400 ~ 700 nm and the curve must be normalized (that is maximum value of your graph is 1), and show the value of sensitivity at 400, 500, 600 nm. (the wavelength can contain errors of ± 1nm)

(2) Draw PL spectrum. A horizontal axis should be wavelength (nm). Drawing range of the horizontal axis should be 400 ~ 700 nm, vertical axis should be corrected by the calibration curve and normalized (the maximum value must be 1.0) In the PL spectrum, you can find two peaks. From the PL spectrum read the value of each peak wavelength (nm) and both peak intensities, and show the values (significant figure of peak values and wavelength must be 4).
(the peak wavelength and intensity should be around 420 nm, 1.00 and 515 nm, 0.5. If your results are far from those values, your score will be less than 60)

(3) Draw PL spectrum. A horizontal axis should be photon energy (eV). Drawing range of the horizontal axis should be 1.6~ 3.2 eV. The vertical axis should be normalized (the maximum value must be 1.0). From the PL spectrum read the value of each peak wavelength (eV) and both peak intensities, and show the values (significant figure of peak values and wavelength must be 4).
(the peak energy and intensity should be around 2.94 eV, 1.00 and 2.38 eV, 0.76. If your results are far from those values, your score will be less than 60)

Deadline 2020/7/10 15:00(JST)
Submitting place: mail box at room 406 of the electrical engineering building.

Write your e-mail address which can receive from tanaka@vos.nagaokaut.ac.jp.
If your score is less than 60, I will inform you. If your written address rejected my mail, I will not inform you.
If you resubmit report, your final score of this report is 80% of resubmit report, however, if the final score is higher than 60, your final score of this report is 60. You can resubmit only one time.