Université M'hammed Bougara Boumerdes

Bs dept. INGEE   Teacher: Mr. Benlefki

Final exan: E273 atomistic   Exam time: 1h30

Ex1 (4marks)

Iron is extracted from iron ore. If 1.150g of iron ore is treated with 50ml HCL solution, FeCl3 solution is formed and completed to 100ml with water. The amount of Fe^{+3}ions corresponds to $0.095mol\ l^{-1}$

1. What is the percentage (%) of iron in the ore?
2. What is the normality of HCl

Ex2 (6marks)

Light spectra emitted from hydrogen atom has a wavelength λ= 4340 Å

a. Determine its transition state (n_2) and at which series this spectrum belongs? if $n_1 = 2$.
b. Calculate the wavelength of emitted radiation in the case of Berylium ($_4Be$) hydrogenoid ion
c. Compare the ionization energies of both hydrogen atom and Berylium ion, if the extraction speed of the electron is 3.10^6m/s

Ex3 (10marks)

A binary chemical elements semiconductor is analyzed with electronic paramagnetic resonance (EPR) technique. The first element is found to be paramagnetic containing unpaired electrons in the outer most shell. The last outer unpaired electron has a set of quantum number of (4,2,0,½)

1. Determine the total charge number (Z) of this element

The second element is also paramagnetic and the corresponding set of quantum numbers of the last unpaired electron is (5,1,0,½)

2. Determine the total charge number (Z) of the second element
3. Compare the second ionization energies of the two elements
4. Give the corresponding quantum formula for the doubly ionized ions
5. If the outer electron of the two elements are excited from the ground state to next level, give the domain of radiation emitted
6. What are the energies of these radiations given off for, each element?

Good luck

Data: $^{56}_{26}Fe$, $^{35.5}_{17}Cl$, $R_H=1.1.10^7m^{-1}$, $h=6.62.10^{-34}J.s$