

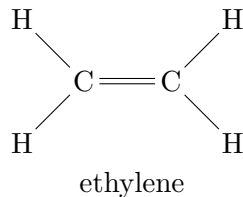
PHY245 Materials Homework number one.

To be handed in on Friday the 13th November 2015

A.Cadby

29/11/2015

1.) Given that the bond polarisation for a C=C bond is 1.65 and for a C-H bond is 0.65 calculate the average shift of the electron cloud caused by a potassium ion at a distance 0.5 nm from the centre of an ethylene molecule. It is worth noting that the units of polarisability are $(4\pi\epsilon_0) \times 10^{-30}$ [5 marks]



2.) Define the Mie potential [2 marks] and derive an expression for the equilibrium bond length of any Mie potential [3 marks]. Using the equation derived write down an expression for the elastic modulus of a material in terms of the constant of attraction (a), the constant of repulsion (b) and the exponents of the distance dependent terms. [5 marks]

3.) Discuss societies use of materials through the ages. [2 marks] Comment on why we are now said to be living in the advanced age, give an example of a modern material and state why you believe this to be a material of the advanced age. [3 marks]