

**Chem 155 Homework #5** Due at the start of class on Mon. Feb 8.

**Reading:** Chapter 14, Nuclear Chemistry

**Chapter 13 Problems**

**13.38**

**13.46**

**13.48**

**13.71**

**Additional Problems**

1) **(re)download** the article by M. Levy and A. D. Ellington in PNAS Vol. 100, p 6416-6421 (2003). If you are on campus you will automatically be able to use the university subscription to the Proceedings of the National Academy of Sciences to download this article. From off-campus you can use the UW library proxy server (instructions are available at <http://www.lib.washington.edu/help/connect.html>).

Read the data from Figure 2 for the reaction of  $L_B$  with  $C_A$  and enter them into Excel to determine the Michaelis-Menten parameters

i) In applying the Michaelis-Menten equation to this data set, does  $[C_A]$  or  $[L_B]$  correspond to  $[S]$  (substrate concentration).

ii) Replot these data as described in Oxtoby and lecture. Fit your data in Excel determine  $K_m$  and  $k_2$  Include the printout of your fit in the homework.

**Chapter 14 Problems**

**14.26**

**14.31**

**14.36**

**14.63**

**14.66**

**Additional Questions:**

1) Why don't all the positively charged protons in the nucleus cause it to fly apart? (Give a 2-3 sentence explanation).

2) Use Einstein's formula to calculate the momentum (in units of MeV/c) of a proton with a total energy of 1400 MeV. What is this in kg m/s? How fast is this proton moving (in m/s)? Comment.

3) List the conservation laws for nuclear reactions given in lecture. What are baryons and leptons?

3) Download and read the series of news focus articles from Science Magazine from August 2005 Science v 309 p 1168-1179, and vol 315 p174 before answering the following:

2A) What fraction of U.S. electricity is currently generated by nuclear power?

2B) What will replace the electricity produced by our aging nuclear reactors once they are decommissioned?

2C) In less than 1 half page, explain your opinion as to whether you think nuclear power should be considered as a viable energy source at present. There is NO right answer but you should justify your opinion with data from the articles and compare costs and benefits of the alternatives.