Chem 820 - Surface Chemistry Homework # 2

Please review the ground rules and expectations for homework, as described in the syllabus. If you collaborate with a partner, please indicate the names of the partners on each set of separate homework that you hand in. Each individual student should hand in a separate set of homework.

1.) Use a computer spreadsheet to complete the following problem. Using the Morse potential (see lecture notes), plot the 2-dimensional potential energy curves for both chemisorbed and physisorbed molecules on a surface. Select the appropriate parameters so as to approximately reproduce the figure in the lecture notes, showing both an activated and non-activated transition from the physisorbed to the chemisorbed state. Show the formulae and parameter values, as well as the final plots of the curves, in what you hand in.

2.) Use a computer spreadsheet to complete the following problem. Generate the plots shown in the lecture notes for Langmuir adsorption. In separate columns, calculate the rate of adsorption, the coverage and the exposure. Your final answer should show two plots: one for the rate of adsorption versus coverage, and a second for the coverage versus exposure. Select reasonable values for the time and pressure in order to achieve a monolayer coverage in a few minutes. In the second plot (coverage versus exposure), show four curves on the same graph for an initial sticking coefficients of 1.0, 0.5, 0.1 and 0.01.