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PHYSICAL CHEMISTRY OF SURFACES

Individual data set (NEPTUN CODE)

Deadline: 18 March

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If you get blocked, contact Ms. Farah as well

26

Physical Chemistry of Surfaces Homework1

Evaluation of low temperature N₂ vapour adsorption isotherms by Langmuir and BET model

1. Plot your isotherm
2. Compare its shape to the IUPAC isotherms, then conclude your isotherm type and explain why? What information you can get from the type you selected (i.e. the characteristics feature of the isotherm).
3. Read V at $p/p_0 \rightarrow 1$; supposing that V is the volume of N₂ in a condensed form, calculate the total pore volume " V_{tot} " supposing that all the gas adsorbed is in liquid form. The density of the liquid N₂ 0.808 g/cm³ at its boiling point (77 K).
4. Plot the linearized form of Langmuir and BET models for the adsorption branch in separate graphs.

27

5. Try to apply the least square linear fit for both models and find the lower and upper limits of the range where the quality of fitting is good (R^2). It is possible that only one of them works. Even if both apply, the limits might be different. If only one of the models give a reasonable fit you continue the work with that particular model.
6. Select 5 or 7 points in equal distance within the selected range (see #5) and apply the least square linear fit and estimate the slope, intercept and regression of the fit; R^2 .
7. Based on the data obtained in (#6) calculate the parameters of the models: monolayer capacity, K (Langmuir) and/or C (BET)).
8. Calculate the surface area from the two models.
9. Supposing that you have cylindrical pores with open ends estimate the average radius of the pores from both models.
10. Take care of the sign, digits and units. Also do not forget to label the axes.

28

OUTFIT OF THE REPORT

Name of the file: YOUR NEPTUN CODE_HW1.pdf

**Title: Physical Chemistry of Surfaces
Homework1**

Your name Neptun code

**Objective: Evaluation of low temperature N_2 vapour
adsorption isotherms by Langmuir and BET model**

29

Show your work following the instructions above. At the end of the report summarize your results in a table :

Sample name:

Type of the isotherm:

Model	Langmuir	BET	Unit
Total pore volume			
Pressure range where linear fit is applicable (if at all)			
Amount required for monolayer coverage (STP)			
K			
C			
Surface area			
Average pore radius			
R ²			

30