

ChatGPT 5.2 Thinking ▾



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SMEB4181 Final report Gr...
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Act as my professor and grade my assignment according to the rubric. Be very critical. Ensure scientific accuracy and correctness with citation from reputable journals.



Thought for 7m 32s >

I'm grading this using the provided rubric (1 = unacceptable, 5 = expert) for **Presentation, Analysis (overall), Application of Scientific concepts, and Quantitative Reasoning**.

SMEB4181 Final report Grading J...

Scores (with blunt justifications)

1) Presentation — 3 / 5

You have a recognizable thesis structure (chapters, figures, tables), and the flow is generally readable. 44826_SHASHA_BINTI_AZMAN_.U200...

But there's a **major professionalism error**: your title is inconsistent about the surfactant identity—cover/title page says **sodium deoxycholate**, while the declaration and abstract header say **sodium cholate**. 44826_SHASHA_BINTI_AZMAN_.U200... 44826_SHASHA_BINTI_AZMAN_.U200...

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Those are not synonyms; they're different molecules, and that undermines trust in the whole report before anyone reaches your results.

2) Analysis (overall) — 2 / 5

Your core narrative is: "higher NaDC → better exfoliation" and you interpret UV–Vis + microscopy + profilometry as support. 44826_SHASHA_BINTI_AZMAN_.U200...

The problem is that the logic often jumps to the "desired" conclusion without ruling out simpler explanations.

Example: you say the A/B excitonic absorption features should appear around ~520 nm and ~620 nm and then argue that peaks become "less obvious" at higher concentration because of exfoliation/quantum confinement. 44826_SHASHA_BINTI_AZMAN_.U200...

Yes, WS₂ commonly shows A/B excitonic features around those wavelengths. PMC

But your own spectra at high concentration look **dominated by baseline/saturation**

effects (very different absorbance scales), and you don't show a controlled approach (e.g., dilution to keep absorbance in a linear regime, baseline subtraction, normalization). Without that, "peak disappearance = more exfoliation" is **not a secure inference**.

Also: you claim an "optimum" at 8 g/L primarily from thickness + surface area arguments,

44826_SHASHA_BINTI_AZMAN_._U200... but you never measure **yield** (concentration of dispersed WS₂) or give a real **size distribution**. In the LPE literature, surfactant concentration can change both **yield and nanosheet dimensions**, so "optimum" must be defined and quantified (not eyeballed). ACS Public...

3) Application of Scientific concepts — 2 / 5

You correctly introduce Beer–Lambert law and what UV–Vis can tell you.

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You also state the standard Tauc relation and exponents (direct allowed vs indirect allowed). 44826_SHASHA_BINTI_AZMAN_._U200...

But there are conceptual errors serious enough to cap this score:

- You list **tungsten dioxide (WO₂)** as a "prominent" example under *Transition Metal Dichalcogenides*. That's simply wrong: TMDCs are **transition metal + chalcogen** layered compounds (e.g., WS₂, MoS₂). 44826_SHASHA_BINTI_AZMAN_._U200... Astrophysics Da...
- You repeatedly interpret **stylus profilometer step height of a drop-cast film** as "nanosheet thickness." Your method explicitly describes drop-casting and using the film/substrate edge to estimate "mean thickness of the nanosheets."
 44826_SHASHA_BINTI_AZMAN_._U200... That is **not** a valid way to measure individual WS₂ nanosheet thickness (layer number). It measures a *film* that can include aggregates and stacked flakes.

4) Quantitative Reasoning — 1 / 5

This is the weakest part.

You do report averages ± spread for profilometry step heights (e.g., 0.359 ± 0.090 μm down to 0.046 ± 0.003 μm). 44826_SHASHA_BINTI_AZMAN_._U200...

But quantitatively, the work is missing the basics of defensible inference:

- No replicate UV–Vis runs, no error bars, no statistical treatment of peak positions/intensities.
- Tauc analysis is shown for **only one condition (2 g/L)** even though you claim "different concentrations." 44826_SHASHA_BINTI_AZMAN_._U200...

- No conversion from absorbance to absorption coefficient is demonstrated (despite defining α), and in dispersions this step is nontrivial. 44826_SHASHA_BINTI_AZMAN__U200...
- No yield metric (mg/mL, extinction-coefficient method, filtered mass) even though surfactant concentration is known to affect yield in LPE. ACS Publications Science

Overall rubric average: $(3 + 2 + 2 + 1) / 4 = 2.0 / 5.$

The biggest scientific issues you must fix (highest impact)

1. Surfactant identity confusion (NaC vs NaDC)

Your report alternates between *sodium cholate* and *sodium deoxycholate*.

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That is a fundamental experimental descriptor. A reader cannot be confident what you actually used.

2. Profilometry "thickness" is being misinterpreted

You computed thickness from "film/substrate edge" step heights.

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Stylus profilometry on deposited films is known to overweight thick/aggregated regions compared with flatter areas, so it can badly misrepresent nanosheet thickness distributions. ACS Publications

If your scientific claim is "higher NaDC produces thinner nanosheets," you need AFM (with statistics) or TEM layer-counting approaches, not a drop-cast film step height.

3. Bandgap / exciton interpretation needs stronger control

You cite excitonic peaks and use them as exfoliation evidence.

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WS₂ monolayer vs bulk physics is well-established (bulk indirect ~1.3 eV; monolayer direct ~2.1 eV). ScienceDirect

Your extracted Tauc values (1.69 eV direct, 1.51 eV indirect at 2 g/L)

44826_SHASHA_BINTI_AZMAN__U200... might happen depending on thickness distribution + methodology, but right now the analysis isn't rigorous enough to defend them (single condition shown; unclear α ; scattering not addressed).

4. "Optimum concentration" is not quantitatively defined

You conclude 8 g/L is optimal mainly because it's "comparable" in thickness to 10 g/L but with larger surface area. 44826_SHASHA_BINTI_AZMAN__U200...

But LPE optimization in the literature often treats **yield** and **nanosheet dimensions** together, and surfactant concentration can push you into regimes of fragmentation vs stabilization. ACS Publications

Also, bile-salt surfactants have critical micellization behavior, and you never discuss whether your concentration range spans relevant micellar regimes (even though this can matter for stabilization). [bdigital.ufp.pt](#)

What would most efficiently raise your grade

- Fix the NaC/NaDC inconsistency everywhere (title, declaration, abstract, methods).
[□ 44826_SHASHA_BINTI_AZMAN_...U200...](#) [□ 44826_SHASHA_BINTI_AZMAN_...U200...](#)
- Add **quantitative yield** (even a simple filtered mass per volume, or absorbance-based concentration using a cited extinction coefficient approach consistent with LPE literature). [Science](#)
- Replace “profilometry thickness of drop-cast film” with **AFM thickness statistics** (histograms of layer number) or clearly relabel it as **film thickness/roughness**—not nanosheet thickness. [ACS Publications](#)
- For UV–Vis: standardize the measurement (dilute to comparable absorbance ranges, baseline correct, report peak positions with uncertainty), and interpret A/B excitons accordingly. [PMC](#)
- Show Tauc analysis consistently (either for all concentrations or justify why only one), and make the α conversion explicit. [□ 44826_SHASHA_BINTI_AZMAN_...U200...](#)
- Fix the TMDC definition error (WO_2 is not a TMDC). [□ 44826_SHASHA_BINTI_AZMAN_...U200...](#)

Astrophysics Da...

If you treat those as “non-negotiable corrections,” the project becomes much more scientifically defensible—and your rubric scores jump fast.

Sources

