

Student Worksheet

The Surface Area-to-Volume Ratio of Nanoparticles: Part II

May 1, 2007

Dear Team:

Thank you for your recommendation on what shape might work best for our nanoparticle catalyst. Trouble is, the nickel isn't reacting as much as we would like.

Please design a prototype for a new shape of particle that would get the greatest surface area-to-volume ratio. Show us, through calculations, why your shape is better than the ones we gave you.

Just so you know, you are in competition with other teams working on the same project. The best design will get a percentage from our profits!

Sincerely,

John Turner, CEO
Hydrogen Fuel, Inc.

Question Which shape would be the most reactive?

Make a Prediction

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Procedure

Using the same clay as you used in Part I of this lab, your team's goals are:

1. Design a new shape with the clay that would be even more reactive than your recommendation in Part I.

Data

2. Draw your shape on the back of this page.
3. Measure any factors (radius, height, width, etc.) that would contribute to surface area and record your measurements (make your own data table) on the back of this page.
4. Label all parts of your drawing that you measured.

Analysis

5. Calculate the surface area of your shape.
6. Calculate the volume of your shape.
7. Calculate the surface area-to-volume ratio of your shape .
8. Be sure to show all of the formulas you used and the calculations you made.

Shape	Diameter (cm)	Length (cm)	Width (cm)	Height (cm)

Shape	Surface area (cm ²)	Volume (cm ³)	Ratio $\frac{\text{Surface Area}}{\text{Volume}}$

Conclusion

9. Explain why your shape is more reactive than the shapes in Part I. _____
