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| **Chemistry 213 Laboratory Report** | **Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| Synthesis of Zinc Oxide Nanoparticles | **Partner \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

Mass of ZnO obtained \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Attach copies of your powder X-ray diffraction pattern and peak list with your lab report.**

Does your powder pattern show that your product is ZnO? Why or why not?

Using data from your peak list and the Debye-Scherrer equation, complete the table below to estimate the particle diameter in your sample. Use peaks at 47.6o, 57.2o, and 63.2o.

|  |  |  |  |
| --- | --- | --- | --- |
| 2θ value (degrees) | FWHM (degrees) | FWHM (radians) | particle diameter (nm) |
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1. What might happen if aqueous solutions of zinc acetate and lithium hydroxide were combined in the synthetic procedure rather than ethanolic solutions? Do you expect that nanoparticles would form?

2. ZnO crystallizes in the same structure as ZnS (wurtzite). In other words, you can conceptually build a ZnO unit cell by starting with ZnS and replacing each sulfur atom with oxygen. How would you expect the dimensions of the ZnS unit cell to compare with those of the ZnO unit cell?

3. How would you expect the positions of peaks in a ZnS powder X-ray diffraction pattern to compare with those for your sample of ZnO?