Chemistry

Standard level

Paper 2

Practice paper

Topic: Measurement and Uncertainty (SL)

1. A chemist measures the mass of a primary standard (10.000 g) three times. The results are 9.221 g, 9.222 g, and 9.221 g.

(a) Describe the accuracy and precision. **[2]**

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(b) Identify the error type and a potential cause. **[2]**

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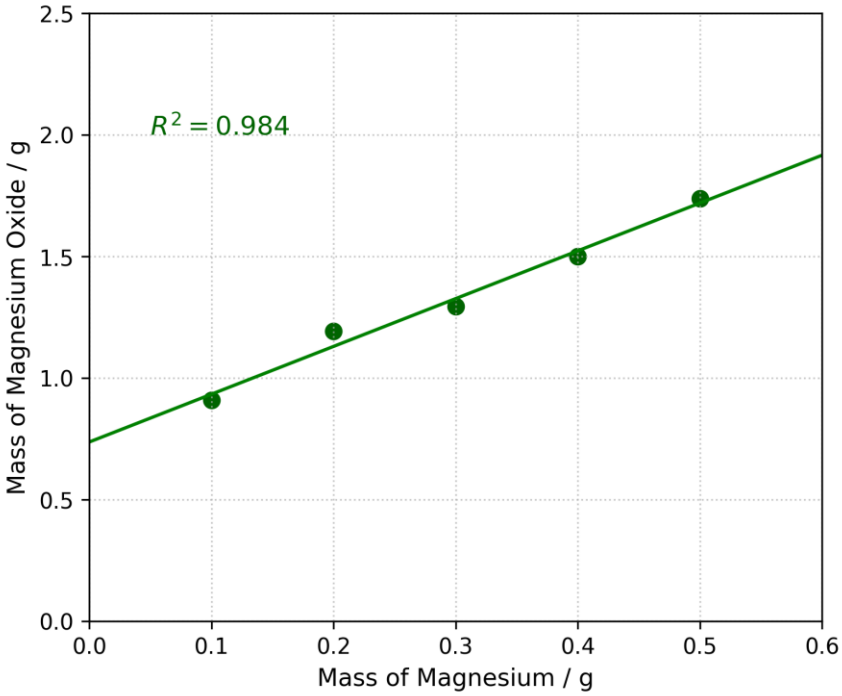
2. The synthesis of MgO from Mg was studied. The experimental plot shows the mass of MgO product against the mass of Mg reactant. The calculated R^2 value of the data is 0.984.



(a) The line shows a significant non-zero intercept. Explain why this represents systematic error and identify a likely procedural source. **[3]**

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3. To prepare a standard solution, a student measured 5.300 +/- 0.001 g of anhydrous Na_2CO_3 and transferred it to a 250.0 +/- 0.5 cm^3 volumetric flask.

(a) Calculate the total percentage uncertainty for the measured concentration. **[3]**

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4. During an enthalpy of neutralization experiment, the temperature rise was 4.5 +/- 0.2 ^{o}C. The literature value for the change was 5.8 ^{o}C.

(a) Compare the percentage uncertainty to the percentage error and deduce if systematic errors were significant. **[4]**

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5. A student used a 'wet' volumetric flask containing water droplets before adding the sodium carbonate solid. Explain how this affects the final concentration and categorize the error. **[3]**

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