a WOW Lab BLUEPRINT

Quanta of Colour

Achievements and Competencies

Learning Outcomes

Grades 10-12
Chemical Reactions
From Structures to Properties

Achievements and Competencies are based on the Common Framework of Science Learning Outcomes (K-12) set by the Canadian Council of Ministers of Education (1997).

Specific Expectations

Grade 10

PHYSICAL SCIENCE

Chemical Reactions

> 213-2 Carry out procedures controlling the major variables and adapting or extending procedures where required (e.g., control major variables when determining the effects of temperature, concentration of reactants, and surface area on a given reaction).

In this activity students control the temperature of the individual test tubes and determine that changing the temperature of the reaction affects the size of the resultant molecules.

> 213-9 Demonstrate a knowledge of WHMIS standards by selecting and applying proper techniques for handling and disposing of lab materials (e.g., use proper techniques for handling and disposing of acids and bases).

In this activity the students are told to add sulfuric acid to the solutions before disposing of them according to their individual school's guidelines. They are also to rinse the glassware with sulfuric acid and water to clean them. The sulfuric acid will neutralize any of the bases and will react with the zinc oxide nanoparticles to form larger particles of zinc sulfate.

> 212-3 Design an experiment identifying and controlling major variables (e.g., design an experiment to test how varying the concentration of a reactant affects the rate of a reaction).

In this activity students are testing the effect of heat on the rate of reaction. By increasing the temperature of one of the test tubes, the rate of reaction increases, which in turn affects the size of the resulting quantum dots. The size of the dots relates to their colour, therefore only the heated reaction is visible under the UV light.

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Quanta of Colour - Achievements and Competencies

Grades 11-12

CHEMISTRY

From structures to properties

321-7 Identify and describe the properties of ionic and molecular compounds and metallic substances.

In this activity, the students determine that the quantum dots are made of the ionic compound ZnO, Zinc Oxide.