STRUCTURE AND BONDING

CHEMISTRY   **LEVEL 2**

Strategy Guide

Structure and bonding is a pretty middle of the road standard. A fair bit of content but it's definitely manageable. Most of the questions assess the concept rather than asking you to remember specifics but there are still a few bits that it's good to memorise here and there.

OVERVIEW OF THE STANDARD

1. Shapes and polarity

2. Types of solid

3. Exothermic and endothermic reactions

4. Enthalpy calculations

STRUCTURE OF THE EXAM

Warning: this section is to help you focus your time/study. Our analysis is based off previous years exams and there is no substitute for understanding the concepts. NCEA can change the exam format without much notice, so the best strategy is to be prepared for anything!

There are generally three questions, one on each of the following topics:

1. Shapes and polarity

2. Types of solid

3. Enthalpy

CONCEPTS AND SKILLS TO FOCUS ON

Although every aspect of the exam is equally important, here are some key concepts to focus your study on:

Shapes and polarity:

Without fail there is always at least one question on shapes and polarity. Sometimes they go together sometimes they are separate questions but they are always there. If you can identify shapes based on the number of regions of electron density and how many of them are occupied and can predict whether a molecule will be polar or non-polar with an explanation as to why it's at least one free E mark every year. Your answer to this question can be very formulaic as it will look the same almost every time so it's good to practice this a bunch and really get a structure that you like down pat that covers all of the important bases.

STUDY TIME

Types of solid:

Again this is a big area but it mostly looks the same form year to year. For each of the 4 types of solid (ionic, molecular, metallic and giant covalent network) you need to be able to compare and contrast, conductivity, melting/boiling points, solubility in water and hardness (plus a few odd ones like malleability and ductility which are pretty similar to hardness). Instead of going out and trying to memorise, for example, whether an ionic solid is conductive or not its generalky a better idea to know what the requirement for being conductive is (free moving charges particles) and what an ionic solid looks like on the molecular level (positive and negative ions in a lattice structure) this will help you come to conclusions a lot quicker, reduce your memorisation load and ramp your ability to discuss why things are to E level no sweat.

Bond enthalpies:

Again the bond enthalpies section is very similar year in year out and if you are comfortable using bond enthalpies and doing a "bonds broken – bonds formed" calculations then it's another pretty free E mark every year.

COMMON MISTAKES:

From the NCEA gods themselves:

Think carefully about the sign of the enthalpy change:

This gives you a lot of information about a reaction and so being able to interpret it appropriately is a good skill to have.

Ensure you talk about solids on the molecular level:

Like we said before, instead of just memorising that metals are conductive, be sure to link that to the fact that metals have a sea of mobile electrons which can move around and conduct electricity.

Lewis structures:

Being able to draw Lewis structures confidently is a huge leg up in this standard as there are going to be at least 2 or three every year. NZQA pointed out that most students struggle with ones involving double or triple bonds so keep an eye out for those ones.

OVERALL STUDY AND EXAM STRATEGY:

This exam is very similar from year to year and so practicing the past exam papers is really helpful for this standard in particular to get an idea of how they like to phrase questions.

A decent grade is definitely achievable for this paper with a bit of hustle and grind. The key is to not rote learn, but try to understand the concepts. Pay careful attention to the wording of your explanations, and use the NCEA exemplars and marking schedules, as well as our walkthrough guides to get that M/E-level wording.

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