

What you need to write better chemistry notes (and what not)?

by [Gaurav Tiwari](#) 🕒 February 18, 2022

Chemistry is one amazing subject. It begins with just an atom and rises to simple substances and then goes above complex polymers – and then again down to subatomic particles. I have been writing a lot recently on how to read, revise and make notes etc., to help you [become a better student](#). Class chemistry notes aren't always the best solution and if you are aspiring to become a chemistry scholar one day – you must rise above the classroom notes and write your own chemistry notes for the change.

This blog post will cover the main details on how to write better chemistry notes and how to revise those.

What do you need to write chemistry notes?

A notebook

First things first. You will need a notebook and with chemistry you will have to be extremely selective.

Chemistry is, like math, not completely textual and may or may-not contain equations, diagrams and graphs. So it is wise to have an unruled notebook with clear plain papers.

Physical & general chemistry topics can be handled over ruled notebooks as these contain lesser number of equations and more tables & data. Ruled notebooks are easier to be tabled and are more data-friendly. But for overall nature, I can recommend plain-unruled notebooks even for the physical and general chemistry topics.

Black, Red and Blue Pens

I used blue pens to write the texts/articles, red to highlight stuffs and black to draw diagrams and [chemical equations](#). I suggest using three such colors to differentiate

blocks and to keep your notes more colorful yet tidy. You may use colored pencils for diagrams, especially those which need to be in 3D – like the three-dimensional shapes of compounds etc..

A printer

This is optional, totally optional. But if you can arrange some prints and stick them to your notebook – you'll be so much better at revision. Using printers you can take printouts of diagrams/shapes that you'll never be able to draw by hand (and neither the exams will require you to). Such can help you clear your concept about a topic, like how a compound looks, how a molecule is *really* structured etc.

Reference Books

Reference books are very important as inputs from these can make your class notes into world class notes. Buy or rent reference books that are well appreciated by scholars and give those a light read. Reference books aren't just helpful around the note-making process, but these also help you dig deeper about a topic.

Recommended by you: [Radioactive Pollution](#)

...and some inspiration

ACIDS

AN INTRODUCTION

definition:
a substance that produces hydrogen ions (H⁺) as the only positive ion when dissolved in water

- pure acids are usually in the form of simple covalent molecules
- ionisation/dissociation: by process of acid molecules forming ions in solution

PHYSICAL PROPERTIES

- sour taste
- blue litmus ⇒ red
- corrosive (strong acids)
- pH of less than 7
- conduct electricity due to presence of hydrogen ions in solution

2 TYPES OF ACIDS

ORGANIC

- weaker
- less corrosive
- found in fruits or living tissue
- e.g. ethanoic, tartaric, citric

INORGANIC

- usually stronger
- more corrosive
- mostly man-made from minerals (∴ can also be known as mineral acids)
- e.g. sulfuric, nitric, hydrochloric

EXTRA

- biological origin
- contain carbon
- highly reactive don't mix with metals
- generally well soluble in water and insoluble in organic solvents
- no biological origin
- derived from inorganic compounds or mineral sources

BASICITY

maximum number of hydrogen ions produced by a molecule of acid in aqueous solution

1 MONOBASIC/MONOPROTIC
provides 1 hydrogen ion per molecule of acid
e.g. hydrochloric, nitric, ethanoic

2 DIBASIC/DIPROTIC
provides 2 hydrogen ions per molecule of acid
e.g. sulfuric, sulfurous, carbonic

3 TRIBASIC/TRIPROTIC
provides 3 hydrogen ions per molecule of acid
e.g. phosphoric(V)

DIBASIC/TRIBASIC acids are able to form more than 1 type of salt when reacted with a base

sulfuric acid + sodium hydroxide → sodium bisulfate + water
 $H_2SO_4 + NaOH \rightarrow NaHSO_4 + H_2O$

CHEMISTRY YOUR BEST!

Covalent bonding

Bobby was always a strange little nonmetal... he never liked to bond covalently. Sometimes, just to give it a try, he'd bond with another nonmetal...

And he'd be happy for a while, because he'd have filled his octet.

But no, he wasn't really one who wanted to SHARE all the time... And after a period, he'd stop.



Ionic bonding

Miss, you dropped an electron...

Oh, why thank you young man!

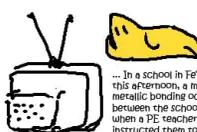


No, he was always more into ionic bonding...

Where they'd be attracted and bonded by charge and not through sharing... ooh ooh ooh ooh!

And it was so that he met his life's love, Millie the Metalloid :D

metallic bonding



And as for metallic bonding... well, he had no idea. It was only things that idiots did....

...the local police had to create heats of over 600 degrees to loosen the bonding...

Interrogations as to WHY the instructor neglected such basic knowledge in bonding continue.

By Masako

OXIDES

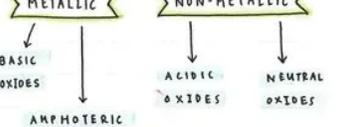
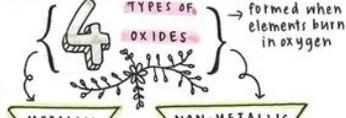
AN INTRODUCTION

definition:
compounds of oxygen with another element

- many acids and alkalis are formed by dissolving oxides in water

ACIDIC OXIDES

- most oxides of non-metals are acidic oxides
- e.g. sulfur trioxide SO_3
- sulfur dioxide SO_2
- carbon dioxide CO_2
- phosphorous(V) oxide (solid) P_2O_5
- react/dissolve in water to form acids (mostly)
- do not react with acids
- reacts with bases and alkalis to form salt and water
- e.g. carbon dioxide + sodium hydroxide
- $CO_2 + 2NaOH \rightarrow Na_2CO_3 + H_2O$
- sodium carbonate + water
- $Na_2CO_3 + H_2O \rightarrow NaHCO_3 + OH^-$
- is silicon dioxide (SiO_2) an acidic oxide
- ↳ solid at room temperature
- ↳ does not dissolve in water
- BUT
- ↳ it reacts with hot concentrated sodium hydroxide to form sodium silicate (salt) and water



BASIC OXIDES

- most oxides of metals are basic oxides
- most basic oxides are insoluble in water
- e.g. magnesium oxide MgO
- copper (II) oxide CuO
- calcium oxide CaO
- all basic oxides are metal oxides except 3
- basic oxides that are soluble react/dissolve in water to form alkalis
- ↳ e.g. sodium oxide Na_2O
- potassium oxide K_2O
- react with acids to form salt and water
- ↳ e.g. magnesium oxide + hydrochloric acid
- $MgO + 2HCl \rightarrow MgCl_2 + H_2O$

BASES & ALKALIS

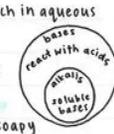
AN INTRODUCTION

definition:
a substance which reacts with an acid to produce a salt and water only, and are metal hydroxides or metal oxides

- contains either oxide ions, O^{2-} , or hydroxide ions, OH^-

PHYSICAL PROPERTIES

- slippery to the touch in aqueous solution
- taste astringent
- red litmus \rightarrow blue
- mostly insoluble
- bitter taste, feel soapy
- dissolve in water
- good conductor of electricity
- soapy to the touch
- corrosive if concentrated



ALKALIS

definition:
a compound that is a soluble base, and produces hydroxide ions, OH^- , as the only negative ions when dissolved in water

- usually group I metal oxides and hydroxides

reactions

ACID (neutralisation)
BASE + ACID \rightarrow SALT + WATER

AMMONIUM SALT

ALKALI + AMMONIUM \rightarrow SALT + WATER
EXAMPLE: SALT + AMMONIA
sodium hydroxide + ammonium sulfate \rightarrow sodium sulfate + ammonia
 $2NaOH + (NH_4)_2SO_4 \rightarrow Na_2SO_4(aq) + 2NH_3(g)$

METAL SALT

ALKALI + SALT \rightarrow SALT + METAL HYDROXIDE
with metal A of metal B
EXAMPLE: sodium hydroxide + copper(II) sulfate \rightarrow sodium sulfate + copper(II) hydroxide
 $NaOH + CuSO_4 \rightarrow Na_2SO_4 + Cu(OH)_2$

COMMON BASES

- sodium oxide Na_2O
- zinc oxide ZnO
- copper(II) oxide CuO
- magnesium hydroxide $Mg(OH)_2$
- aluminium hydroxide $Al(OH)_3$

COMMON ALKALIS

- sodium hydroxide $NaOH \rightarrow Na^+ OH^-$
- calcium hydroxide $Ca(OH)_2 \rightarrow Ca^{2+}, OH^-$
- potassium hydroxide $KOH \rightarrow K^+ OH^-$
- barium hydroxide $Ba(OH)_2 \rightarrow Ba^{2+}, OH^-$

if insoluble in water, resulting metal hydroxide appears as a precipitate!

What is the difference between resonance structures & true structures?

Resonance Hybrid: True structure of molecule represented by a set of resonance structures

Why does charge delocalization stabilize a molecule?

"True structure" $H-C^{\delta+}=C-H$ with partial positive charge delocalized over carbon 1 & 3.

Some sets of resonance structures have one structure that is very good.

BEST because no formal charges (major contributor, lowest energy, most stable)

Worst (minor contributors)

Next best (Beyond Worst)

Resonance structures are used to represent true structure of molecule. The more resonance structures you can draw, the more stable the molecule due to delocalization of e^- .

Additionally, keep the periodic table, your class notes and a pencil with you.

Click here to [download the periodic table in PDF](#) and keep a print of it.

What do you not need or what you should avoid?

An Opinion

First of all – consider this article as a suggestion but not an opinion while making your own chemistry notes. But you will find people telling you how to revise this and that etcetera. Basically, it's very important to understand that everyone has their own way of studying. Try to stick around with that. Avoid opinions and don't change your roots. Your notebook should be written in a monotonic way. You will be needing opinions and all in your chemistry projects but never in the note-making process.

Too many books

Don't go for too many books. It's recommended to buy only a single book for a subject – generally the one recommended by your class teacher. Too many books can mess up your memorizing process and violate the instructions provided by your teacher. If you want to add another one to your bag, lookout for some good reference books.

Time gaps

When I say, “Your notebook should be written in a monotonic way.” – I mean not only the style it's being written – but also considered the flow of writing. If you give too much of time gaps between pages – your writing will worsen and instead of creating a perfect notebook, you may end up with a load of crap. Continuity is important and you should try to complete your notes on time – as much as possible.