

Name: Ms. Hayduk
Lab Partner: Mimi Self

Due Date: February 12, 2018
Period: 6

Lab 2: Intramolecular Forces

Physical Appearance

Salt: white, solid, granular, shiny, hard, small, square particles, odourless, opaque

Sugar: white, solid, granular, shiny, hard, odourless, opaque, odourless

Wax: off-white, glossy, solid, flexible, translucent, odourless, smooth, waxy

Melting Point

First: wax (melted quickly and evaporated)

Second: sugar (melted more slowly than wax, turned into a liquid and started to burn)

Last: salt (did not melt at all)

Solubility in Water

Dissolved: salt, sugar

Did not dissolve: wax

Solubility in Hexane

Dissolved: wax

Did not dissolve: salt, sugar

Conductivity in Solution

Resistance is inversely proportional to conductivity – lower resistance = higher conductivity

Salt: 150k Ω - highest conductivity

Sugar: 400 k Ω

Wax: did not test (not a solution)

Discussion

1. Salt: ionic – has a metal and a non-metal (sodium and chlorine)
Sugar: polar covalent – all non-metals, and C – O bond has EN difference of 0.8
Wax: non-polar covalent – all non-metals, and C – H bond has EN difference of 0.4

2. Ionic compounds: high melting point, soluble in polar substances, insoluble in non-polar substances, high conductivity when dissolved
Salt demonstrates the properties of ionic compounds. It did not melt at all on the hot plate, meaning it has a high melting point. It dissolved in water, which is a polar substance, but it does not dissolve in hexane, which is non-polar. When the resistance was tested in the water-salt mixture, it was low, which means it is conductive.

Polar covalent compounds: moderate melting point, soluble in polar substances, insoluble in non-polar substances, low conductivity when dissolved

Sugar was the polar covalent substance examined in this lab. It melted second on the hot plate, which means it has a higher melting point than wax, but lower than ionic compounds like salt. It dissolved well in water, but does not dissolve in hexane, which means it can dissolve in polar substances but not in non-polar substances. It was slightly conductive when in solution, but less than salt water.

Commented [HH1]: Handwritten, all that is asked for is included, some additional observations, includes units where necessary

Commented [HH2]: Based on my understanding of intramolecular forces (covalent/ionic) and bond polarity, but you may have needed to look this up for sugar and wax – if you did, you needed to cite your source and be brief

Commented [HH3]: This is JUST based on what I saw in the lab, and is brief and to the point

Commented [HH4]: This part clarifies the properties I listed with respect to my observations for salt (which I told you in Question 1 was ionic)

Commented [HH5]: Summarize...

Commented [HH6]: ... And clarify. Here I had to compare to wax and salt because sugar was sort of in the middle. You'll notice that I still haven't used any other resources yet – just my observations from the lab.

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Non-polar covalent compounds: low melting point, insoluble in polar substances, soluble in non-polar substances, no data about conductivity

Wax is the non-polar substance in this lab. It likely behaved differently than sugar and salt because it does not have any charges on its molecules (partial or ionic). Wax had a very low melting point and was the first to melt of the three substances. It also does not dissolve in water but does dissolve in non-polar substances like hexane. Conductivity was not measured for wax, but it can be hypothesized that it would not conduct electricity because there are no charges to force the movement of electrons (electricity).

In terms of physical properties, the salt was the hardest solid, and wax was the softest and most flexible.

3. Predictions:

Substance	Most Like...	Soluble in Water	Soluble in Hexane	Conductivity	Melting Point
Coconut oil	Wax	No	Yes	No	Low
Potassium iodide	Sodium chloride	Yes	No	Yes, in water	High
Fructose	Sucrose	Yes	No	Moderate, in water	Moderate

Commented [HH7]: Summarize...

Commented [HH8]: ... And clarify.

Commented [HH9]: This is the kind of thing that takes you from A to A+ - I made a prediction for something that I didn't observe, based on my knowledge of polarity and electricity (from grade 9!)

Commented [HH10]: This part is what was important, even if you didn't explicitly say this. Basically, could you identify that coconut oil is like wax, and would have similar properties, and that fructose and sucrose are similar, etc.?