

Re: Ionization vs. Dissassociation

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- *From:* Bob <bbx107@xxxxxxxxxxx>
 - *Date:* Sun, 01 May 2005 10:17:54 -0700
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On 30 Apr 2005 16:15:20 -0700, "Ryn" <yandoryn@xxxxxxxxxx> wrote:

....

>

>When you dissolve NaCl in water (though someone has pointed out that it
>is not completely polar [nothing is black and white in chemistry]

remember, you said that :-)

>it is

>still much more polar than HCl) the NaCl is simply being pulled apart.

>The sodium is already an ion; so is the chloride. When you look at the

>crystalline structure of the NaCl they are not sharing electrons,

>rather they are attracting each other. When you put it in water they

>are attracted more to the polar-covalent molecule of water and pull

>apart. The sodium is not taking an electron from the chlorine, nor is

>the chlorine taking an electron from the sodium---this has already taken

>place. They are already ions.

>

>This brings up the question---are double-replacement reactions chemical

>changes? When you take the two solutions (that contain ions) and mix

>them together, there is no electron movement whatsoever. The ions

>remain as ions---the precipitant is simply a non-soluble ionic compound.

You produce a new compound, eg BaSO₄, a distinct composition of matter
that you did not have before.

A definition of chemical change that excludes this reaction is a
strange way to go!

>

>Some argue that this simply isn't an oxidation-reduction reaction.

>Others argue that it isn't a reaction at all.

They do? Who?

Re: Ionization vs. Dissociation

>

>As for the difference between physical and chemical reactions—I have
>had this drilled into my head from eighth grade science

That may be part of the problem. 8th grade science tends to get simplified. Things become black/white.

I think the reason that dissolving NaCl is taught as physical change in early chem is that the dissolving is reversed by simple evaporation. (Salt. Add water, remove water. Get back the original salt) In the absence of any understanding of what dissolving really is at that point, that is a useful criterion.

Seems to me that we substantially agree on what happens when NaCl dissolves. Why, then, is it necessary to declare that it is a chemical or a physical change? (Reminds me of my high school biology teacher trying to explain why bacteria were considered little plants — back in the days when the only choices were plants or animals.)

>and on—yes

>they have incorporated this before we knew anything about bond types.

>But it is on the Texas Assessment of Knowledge and Skills (TAKS), so we

>must know it to graduate.

>

>It is funny that things that are debated constantly are considered core

>curriculum.

yep

>

>In my TAKS review, the science teacher stood in front of me and said,

>"Dissolving is a physical reaction." Now, if you have looked at this

>topic, you can see that would make me upset. As I have gone as far as

>possible in science at my school, and I was being forced into sitting

>through a science TAKS review, I was feeling rebellious.

Good for you. Wanna write a letter to TAKS?

>I asked him if

>this was always true. He said of course it was. And that we would be

>asked it on the TAKS. So I pointed out my HCl (g) dissolving which is

>chemical as we have been taught.

>

>Wow. This is rambling.

>

>But to the point—the difference between a chemical and a physical

>change is, in my opinion, if anything changes on the atomic level.

>

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>When you dissolve NaCl in water, it changes not on the atomic level,
>but on the structural level. Electrons aren't moving.

That is just wrong. It is not obviously wrong to the 8th grader, with no study of chemical bonds. But it should be clear enough to anyone with a year of college chem.

You yourself agreed that the NaCl bond in the crystal is not 100% ionic, but then you chose to dismiss that. You're welcome to dismiss it for simplification, but then you can't draw conclusions that, in part, depend on understanding that there is no such thing as a pure ionic bond.

bob

• *References:*

◆ *Re: Ionization vs. Dissassociation*

◇ *From:* Ryn

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