

5.5 Two Plus Six or Six Plus Two?

Kyle and Kailey discuss valence electrons and how various elements in the same column on the periodic table have patterns of similar valence electrons.

Kyle: So, nature takes the easy way.

Kailey: The most energy efficient way, Kyle.

Kyle: Yeah, whatever...

Kailey: Don't say whatever to me, Kyle. That's rude!

Kyle: Oh, oh! Hoo boy!

Kailey: What?!?

Kyle: Nothing! Nothing...it seems we're a bit out of whack this morning...can we go back to being in balance?

Kailey: What makes you think we're out of balance, Kyle? *(silence for about 30 seconds)*
Yeah, you're right. That's probably a good idea.

Kyle: So, ah...electrons are kind of like rocks, huh?

Kailey: As far as the energy needed to move them, yes.

Kyle: It's a pattern then, isn't it?

Kailey: All the elements in the first column always lose their one valence electron.

Kyle: And that makes them a positively charged ion.

Kailey: The elements in the second column all have a positive two ion charge.

Kyle: Because they all lose their two valence electrons. And the elements in column 13 lose three electrons for a positive three ion charge.

Kailey: What do you think happens when you get to column 14?

Kyle: Hmm. It could go either way... *(Kailey interrupts)*

Kailey: Exactly. That's why carbon is such a cool element. It can either gain four electrons or lose four.

Kyle: How do you know which way it's going to go?

Kailey: It depends on what it reacts with. If you react carbon with something that loses electrons, carbon will gain electrons. If it reacts with something that gains electrons, carbon will lose.

Kyle: So carbon can either be a +4 or an -4 ion charge. Is that why we are carbon-based life forms?

Kailey: Hmm, that's interesting. Organic chemistry is all about the chemicals based on chains of carbon.

Kyle: Chains...like with links and all?

Kailey: Sort of, yeah, since carbon can either gain or lose electrons, it can join up with itself. In doing that, long chains of carbon molecules can form.

Kyle: I wonder if life could be based on silicon? Because it's right underneath carbon in column 14.

Kailey: That would make for an interesting science fiction story. Sand creatures...

Kyle: The pattern continues on the other side of carbon, but goes the other way.

Kailey: Huh?

Kyle: Column 15 has five valence electrons, so it gains three more electrons for a negative three ion charge.

Kailey: Ok, I get it. And the rest of them?

Kyle: Column 16 all have a negative two charge, column 17, negative one and column 18 has no charge because it doesn't gain or lose electrons.

Kailey: And they're all gases.

Kyle: Column 18...yeah...huh. Cool. Plus one, plus two, plus three, plus or minus four, negative three, negative two, negative one, nothing.

Kailey: That sure looks like a pattern to me.

Kyle: That means it's always six plus two.

Kailey: What do you mean?

Kyle: The title of this dialogue. An element with two valence electrons will never gain six more, so it can never be two plus six.

Kailey: Yep. If it has six valence electrons, an element will always gain two...six plus two.

Kyle: Patterns...I think there's a pattern with us...We can talk about other things, but we have trouble talking about us.

Kailey: You may be right...we should talk about this some more.

Author – Michael Felske

© 2013 Moose Moss Press