Qualitative analysis of a mineral water – Correction

1. The ions of the column on the left are all positively charged => These are cations.
2. Ca : Z = 20 => $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$.
   Ca^{2+} bears 2 positive charges => It has lost 2 electrons.
   ⇨ Ca^{2+} : $1s^2 2s^2 2p^6 \mathbf{3s^2 3p^6}$. **8 valence shell electrons**
   Mg : Z = 12 => $1s^2 2s^2 2p^6 3s^2$.
   Mg^{2+} bears 2 positive charges => It has lost 2 electrons.
   ⇨ Mg^{2+} : $1s^2 \mathbf{2s^2 2p^6}$. **8 valence shell electrons**
   Na : Z = 11 => $1s^2 2s^2 2p^6 3s^1$.
   Na^+ bears 1 positive charge => It has lost 1 electron.
   ⇨ Na^+ : $1s^2 \mathbf{2s^2 2p^6}$. **8 valence shell electrons**
   K : Z = 19 => $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$.
   K^+ hears 1 positive charge => Il has lost 1 electron.
   ⇨ K^+ : $1s^2 2s^2 2p^6 \mathbf{3s^2 3p^6}$. **8 valence shell electrons**
3. All these ions satisfy to the octet rule => They are stable.
4. The ions of the column on the right are all negatively charged => These are anions.
5. Cl : Z = 17 => $1s^2 2s^2 2p^6 3s^2 3p^5$.
   Cl^- bears 1 negative charge => It has gained 1 electron.
   ⇨ Cl^- : $1s^2 2s^2 2p^6 \mathbf{3s^2 3p^6}$. **8 valence shell electrons**
   F : Z = 9 => $1s^2 2s^2 2p^5$.
   F^- bears 1 negative charge => It has gained 1 electron.
   ⇨ F^- : $1s^2 \mathbf{2s^2 2p^6}$. **8 valence shell electrons**
   All these ions satisfy to the octet rule => They are stable.
6. One « strategy » to stabilise an initially unstable element is to add or take off 1 or more electrons and turn it into an ion.
7. Hydrogen carbonate, sulfate and nitrate ions are not made up of a single atom. Simply adding electrons to carbon, oxygen, sulfur or nitrogen atoms was therefore not enough to stabilize them.
8. The atoms of these polyatomic ions are linked to each other. They have not lost or gained electrons, but share them.