

Answers for Predicting Products of Chemical Reactions

For all combustion reactions of hydrocarbons or hydrogen-carbon-oxygen molecules, the products will always be CO_2 and H_2O (assuming a complete reaction).



Note that Mg can only form Mg^{2+} and I can only form I^- , so the product will must have a 1:2 cation:anion ratio.



Note that the product is not H_2Cl_2 . It is important to recognize that CuCl_2 is made of three ions, Cu^{2+} and two Cl^- .



In this question, you must recognize that perchlorate, ClO_4^- , and hydroxide, OH^- , are polyatomic ions and will not break apart. Also, this is an acid-base reaction, so the products should be salt and water.



When reactions have heat as a reactant, it is very likely that they will involve decompositions. Carbonate compounds usually decompose to CO_2 and a metal oxide.



Note that one reactant is in its elemental form; if a single replacement reaction is going to occur, the species NOT in its elemental form in the reactants (H^+ in this case), will end up in its elemental form in the products (H_2) and the species that IS in its elemental form (Zn) will end up ionized (Zn^{2+}). Note that zinc can *only* form a Zn^{2+} ion, so it will have two chloride ions. Note also that hydrogen in its elemental form is H_2 , not H.



Again notice that one species is in its elemental form (Na). The magnesium in MgCl_2 is an ion (Mg^{2+}), but is transformed into its elemental state (Mg), while the Na is converted into an ion (Na^+ , sodium *only* forms a +1 ion).



Recognize that carbonate is a polyatomic ion (CO_3^{2-}) and that the cations are already stable ions (Ca^{2+} and K^+).



Note that both materials are elemental species, so the only result could be a synthesis reaction. In the product, K^+ and Cl^- are formed. Note that we would NOT write the product as K_2Cl . Ionic compounds are written in their simplest forms.



Note that phosphate (PO_4^{3-}) is a polyatomic ion and will not break apart. Since barium is a +2 ion, the barium phosphate will have a 3:2 ratio of $\text{Ba}:\text{PO}_4$ in order to balance the charge.



Notice that sulfate (SO_4^{2-}) is a polyatomic ion and that potassium exists as a +1 ion (K^+). Also, this is an acid-base reaction, so the products should be salt and water.



Another decomposition that will generate CO_2 and a metal oxide (note that Al forms a +3 ion, Al^{3+} , and monatomic oxygen will have a -2 charge, O^{2-}).

Predicting Chemical Reactions Answers

**Eugene Franz Roeber, Howard Coon
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