

Name: _____

Date: _____

The purpose of a catalyst is well illustrated in this decomposition reaction of hydrogen peroxide into its elements. Describe the entropy change of the reaction based on the video.

Equation:

Sign of entropy change:

Sign of enthalpy change:

Reason:

The enthalpy change in the reaction between sodium and chlorine is so great that sand must be placed in the bottom of the reaction vessel to prevent explosion. Predict the entropy and enthalpy change for this reaction.

Equation:

Sign of entropy change:

Sign of enthalpy change:

Reason:

The reaction between bromine and aluminum is furious as crystals of aluminum bromide are produced. Predict the enthalpy and entropy change for this reaction.

Equation:

Sign of entropy change:

Sign of enthalpy change:

Reason:

Determine the sign of the entropy change from the reaction between copper and nitric acid. Note the blue solution of copper (II) nitrate and the production of nitrogen dioxide gas. Give the reaction equation.

Equation:

Sign of entropy change:

Reason:

The reaction of barium hydroxide octahydrate and ammonium chloride can be used to demonstrate the varying degrees of an enthalpy change. Note the piece of wood used in this demo.

Equation:

Sign of entropy change:

Sign of enthalpy change:

Reason:

On May 6, 1937, the German zeppelin Hindenburg arrived in Lakehurst, New Jersey after completion of a transatlantic flight. The tragic fire that destroyed the zeppelin is one of the great disasters in the history of air travel. Thirty-six would die in the tragedy, and the fire, hydrogen chemistry at its most powerful, would soon end the era of the zeppelin. The radio broadcast (although not aired until the following day) by Herb Morrison as well as the cover of *Led Zeppelin I* have given the event added permanence.

Equation:

Sign of enthalpy change:

The “volcano” produced from the catalytic decomposition of ammonium dichromate using mercury (II) thiocyanate is somewhat unsettling because of its “snake” image.

Equation:

Sign of entropy change:

Sign of enthalpy change:

Reason:

The decomposition of potassium chlorate by means of heat provides an oxygen environment that is suitable for spontaneous combustion of hydrocarbons, sugars included.

Equation:

Sign of entropy change:

Sign of enthalpy change:

Reason:

The mechanism behind the reaction between malonic acid, hydrogen peroxide, potassium iodate, sulfuric acid, manganese (II) sulfate, and starch is still not understood. Watch the large beaker carefully!

Free energy change:

Reason:

Nitrogen triiodide is considered a contact explosive. Note the violet vapor that is produced from this reaction.

Equation:

Sign of entropy change:

Sign of enthalpy change:

Reason:

The reaction between zinc and sulfur does not take at room temperature. A heat source can be used to start the reaction.

Equation:

Sign of entropy change:

Sign of enthalpy change:

Reason:

White phosphorous, or tetratomic phosphorous, must be stored in a special environment to prevent it from reacting with air. In particular, the phosphorous will react with oxygen.

Equation:

Sign of entropy change:

Sign of enthalpy change:

Reason:

Alkali metals, like sodium and lithium, react with water violently. The solution that remains after the reaction is basic because of the hydroxide ions that are created.

Equations:

Sign of entropy change:

Sign of enthalpy change:

Reason:

Magnesium reacts with oxygen when heat is present. This product will then react with carbon dioxide in a synthesis reaction. Heat is again necessary to initiate the reaction.

Equation:

Sign of entropy change:

Sign of enthalpy change:

Reason: