

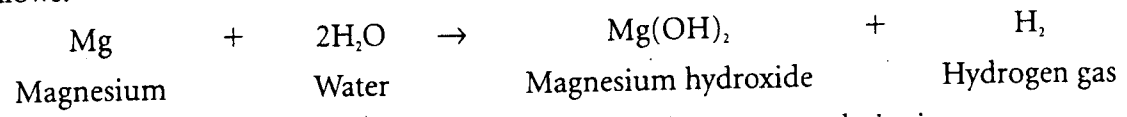
SECTION 17-3 **ENRICH**

Flameless Ration Heaters

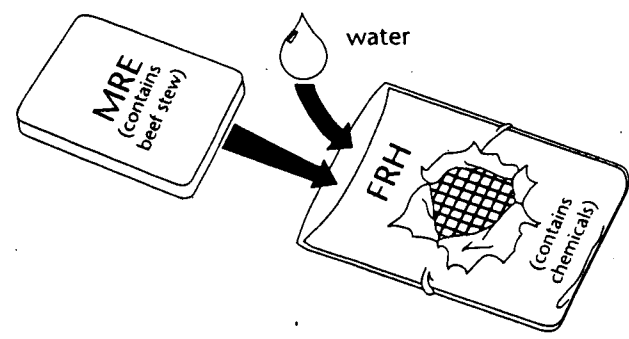
Suppose that you are a soldier on patrol far from your base camp. The weather is very cold and you wish you had something warm to eat. However, you aren't carrying a camp stove and it would be too dangerous to light a fire because its smoke would reveal your position. Luckily, you have a *Meal Ready to Eat* (MRE) and a *Flameless Ration Heater* (FRH) in your backpack. (A ration is a portion of food.)

An MRE is a meal, such as beef stew, inside a special pouch made of aluminum foil and plastic. To heat your MRE, you slide it into an FRH. An FRH is a kind of plastic envelope that contains certain chemicals. When you add water to the FRH, an exothermic reaction occurs. The heat produced by this reaction warms up your meal in about 15 minutes.

The chemicals inside an FRH include magnesium (Mg), iron (Fe), and sodium chloride (NaCl). The reaction that takes place when water is added to an FRH is as follows.



The reaction of magnesium and water is normally very slow. As a result, it gives off heat very slowly. In an FRH, however, this reaction occurs much faster and so it gives off heat much faster as well.



Answer the following questions on the back of this sheet or on a separate sheet of paper.

1. Iron and sodium chloride are present in an FRH, but they are not reactants in the equation shown above. Why do you think they are included in an FRH?
They are catalysts.
2. Why do you think an FRH doesn't come with water already in it?
The exothermic reaction would already have taken place and no more heat would be given off.
3. Do you think there are small pieces or large pieces of magnesium metal in an FRH? Explain.
Small - larger surface area results so the rate of rxn increases as well
4. Why is it important that the reaction in an FRH be fast?
So that a large amount of heat will be given off in a short period of time.