

### Your Turn 10.13 You Decide Dangers from Chemical Leaching?

*Modernist Cuisine*, one of the defining volumes for *sous vide* cooking, claims that bags made expressly for cooking are safe.

- What type(s) of polymers are used in such specialized *sous vide* bags?
- Using the Internet as a resource, are these specialized cooking bags immune to the leaching of unwanted chemicals into our food? Consider what happens to the polymer(s) at the temperatures commonly used for *sous vide* cooking.
- Would the threat of chemical leaching into food be greater if other inexpensive bags (e.g., Ziploc™) were used instead of the specialized *sous vide* variety? Explain.

## 10.7 | Microwave Cooking: Fast and Easy

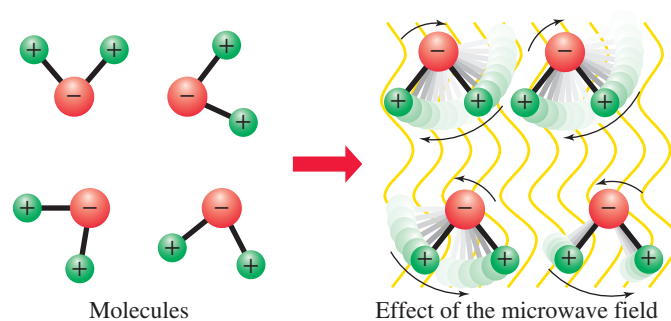
As our work schedules get busier and work days get longer, many of us do not always have sufficient time to prepare a complex meal from scratch. In our increasingly busy society, microwave cooking has risen to become the most popular form of cooking because of its speed and simplicity. However, food quality is not nearly as desirable as that cooked over a stove or in an oven, where one has more control over the chemical reactions and resulting development of flavors.

### Your Turn 10.14 Skill Building The Electromagnetic Spectrum Revisited

In Chapter 3, we discussed the various regions of the electromagnetic (EM) spectrum.

- Describe the relative energies and wavelengths of the UV, IR, and microwave regions, and diagram how each of these energies would affect a water molecule (*i.e.*, bond breaking, bond stretching/vibration, or molecular rotation).
- A company claims to have a new type of cooking apparatus using radio waves to cook food. Their claim is that the food is cooked more uniformly and that food quality is better than using microwaves. Do you believe their claims? Explain your answer.

Due to its lower energy and longer wavelength than UV, visible, or IR radiation, microwave radiation is not sufficient to cause rupturing of individual chemical bonds. Instead, the microwave radiation is absorbed by the water, fat, and sugar molecules in food, which causes these molecules to rotate (Figure 10.9). Since the molecules rotate some 2.5 million times per second, they can easily bump into and rub against



**Figure 10.9**

Illustration of the rotation of polar molecules in response to an applied external microwave field.

Some common types of polymers and their properties were described in Chapter 9.



"What do you mean, you're not hungry? - Your mother spent two minutes cooking that in the microwave just for you!"

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*Did You Know?* If you look closely at the front window of your microwave oven, you will notice a metal mesh. This is designed to be transparent to visible light, but opaque to microwave radiation. That is, the holes in this mesh are smaller than the wavelengths of the microwaves, but large enough so visible light may still pass through.