

SECTION 18-3**ENRICH**

Pulling Away Electrons

You know that the metals in Group 1 and 2 are quite reactive. They combine easily with other elements to form compounds by losing electrons. Atoms from Group 1 lose one electron; atoms from Group 2 lose two electrons. It takes energy to remove an electron from an atom. Some atoms hold their electrons tighter than others do. Also, an individual atom holds some of its electrons tighter than others.

The size of an atom's radius affects how tightly its electrons are held. The larger the radius of an atom, the farther away from the nucleus some of its electrons are, and the less tightly they are held. The electron held the least tightly is easiest to remove. To remove yet another electron requires more energy than was needed to remove the first. The figure below compares the atomic radii of the Group 1 and 2 elements. The number underneath each element represents the atomic radius measured in picometers (pm).

Answer the following questions on a separate sheet of paper.

1. What do you notice about atomic radius as you move down a group?

As you move across a period from Group 1 to Group 2?

- It increases - Decreases

2. Which element would you expect to be the most reactive in Group 1? In Group 2? Explain your answer.

Cesium; barium - they have the largest atomic radius in its group, electrons

3. In each period, which element of the pair would you expect to be more reactive? Explain your answer.

Group 1 because of the larger atomic radius.

4. As you go across the periodic table, atomic radius continues to decrease. How does this fact help explain why the atoms of noble gases don't react easily with other atoms?

Noble gas elements would have the smallest atomic radii which means that their electrons would be held onto the tightest.

| | Group 1 | Group 2 |
|---|-----------|-----------|
| 2 | Li 152 | B 112 |
| 3 | Na 186 | Mg 160 |
| 4 | K 227 | Ca 197 |
| 5 | Rb 248 | Sr 215 |
| 6 | Cs 267 | Ba 222 |