Opening Article

It's fun to study chemistry

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When I was in elementary school, I never had science lessons. This was because I spent my school years in civil-war China, not being allowed to return to Japan after the end of World War II. I studied mainly Japanese and arithmetic at a Japanese elementary school that resembled a temple school from 1947. The teacher there taught us many things besides the classroom lessons. For example, he taught us how heat is transferred by conduction, convection and radiation by pointing out the efficacy of heaters used in the wintertime at temperatures as low as 30 degrees below zero; the composition of air, the relationship between air density and air temperature, and fuel by showing us how to make fire in a stove; and the germination, growth and capillary action of plants through farm work. When I entered junior high school (being the only Japanese student) in 1950, I had my first science lessons. Although there were no experiments in botany, zoology and physics, I enjoyed having my past fragments of knowledge consolidated. Everything in chemistry was new and a fresh surprise for me. The chemistry teacher, who talked in a small voice and stuttered, showed us experiments in every class with a lively passion, by which not only myself but everyone in the class was fascinated. We all respected the teacher.

I think experiments are essential in chemistry classes. Because chemistry covers atoms and molecules that cannot be actually felt, it is difficult for most high school students to understand chemistry without experimenting. However, the use of experiments in chemistry has actually continued to decline in many schools, and the generation educated in such an environment now makes up much of middle level teaching staff. Moreover, I have heard that teachers have no choice but to set up classes with as few experiments as possible due to the tight curriculum schedule, irrespective of whether they wish to conduct experiments.

According to the results of the high school student survey (conducted in 2002) announced by the Ministry of Education, Culture, Sports, Science and Technology in 2004, the subject that most received an overwhelmingly negative evaluation among the seven subjects (Japanese, mathematics, English, physics, chemistry, biology, earth science) was chemistry, with the least positive response for "understandable," "favorite" and "important." In the later revised curriculum guidelines, emphasis is laid on "Chemistry and Its Role" (Chemistry I) and "Life and Material" (Chemistry II), and the importance of learning chemistry is explained in the textbooks. Under the new guidelines, which take effect next school year, basic chemistry begin with "Chemistry and Human Life." I hope the awareness of high school students is improving.

The reason why many high school students do not like or find it unimportant to study chemistry probably lies separately from their awareness of chemistry. For many students, chemistry without experiments is difficult to comprehend and usually requires a lot of memorization. It may be natural for students to assume that things memorized for exams are soon forgotten, so studying chemistry is only necessary for exams.

With the hope that more chemistry classes would make students think on their own, satisfy their intellectual curiosity and provide a feeling of accomplishment, I continue my activities in microscale chemistry experiments and green chemistry education.

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