

Chemistry Chat

Encouragement of Research (Part 1)

–Research Attitude–

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Forty years have passed since I entered university and decided to pursue a career in chemistry. During this period, I have had many opportunities to come into contact with the valuable words of my seniors, but I have not been able to make full use of them because I have not listened to them. Now, I have reached the age where I can give advice to my younger colleagues. I would like to take this opportunity to share some of the thoughts I have gained from my experiences (or secondhand knowledge from my seniors) in three articles. It does not matter that you will not listen to them as I have done, but I will be happy if even one of them remains in your mind.

Literature Search

If you are around people who are "hard to give up," "hard to understand," "hard to get along with," or "skeptical," you probably do not want to be around them and try to avoid them as much as possible. However, with regard to research, this is the right kind of person. In other words, they are "people who can endure even if they do not get results," "people who do not get caught up in common sense and do not make quick judgments," "people who do not follow the lead of others," and "people who do not readily trust textbooks or the work of others".

Literature searches are important for understanding the history of past research. On the other hand, the more we search the literature, the more some people fail to take the first step. If you do not start experimenting because you think, "The reason this work did not get any hits in

the literature search is because someone else already tried it and did not succeed," or "Other people have already thought of it anyway, then I have nothing to gain". After doing some literature searching and thinking about it to some extent, it is important to give it a try.

Some students say, "I could not find any hits in my literature search, so this reaction should not proceed." In such a case, we should be rather pleased because research is the search for something new that has never been done before. You are relieved when walking on a road that has been found by someone else, but the probability of creating something new is low. It is only when we take a path that no one else has taken that we are able to do original research. Before thinking "**Impossible**," we should think "**I'm Possible**".

Serendipity

It is the "accidental discovery of something valuable". It is well known that the works of Nobel laureates in chemistry, Dr. Hideki Shirakawa and Dr. Koichi Tanaka, were derived from their mistakes. Some people say that they were simply lucky, but they were recognized for

establishing new work that would be discarded as a failure by other people.

When starting a research project, everyone hopes for the results they considered. There is no doubt that we are happy when we get such results, but such cases are

not unexpected and the themes often converge. When unexpected results are obtained, it is a chance to develop a new theme. Some students do not want their failures to be known and immediately discard them, but they should stop and think, "Why did it happen?" and "Can something new be derived from it?". What you find at such a time is something that you have not thought of, so it is likely to be an interesting result that others have not thought of either. When you fall down, you should not get up holding nothing.

So, what abilities are needed to seize this good fortune? In addition to "the ability to observe unusual results without missing them," you need "the perseverance not to give up easily" and "the mental strength not to give

in to the pressure of the supervisor (boss)." The latter ability is especially important when you have a theme to work on and you have to take extra time to pursue new results.

Nevertheless, if you think that there is a gem among valueless stones and try to find it, you may not usually find it, and you may find yourself in a quagmire. Gems are valuable because they are not easily found. It is difficult to make a decision whether you retreat or not because gemstones in the rough are sometimes indistinguishable from valueless stones. In such cases, it is necessary to have discussions with your supervisor and seniors and share opinions with them, because the intuition or experience of elders is quite reliable.

Author Information



Professor Nagatoshi Nishiwaki received a Ph.D. in 1991 from Osaka University. He worked in Professor Ariga's group in the Department of Chemistry, Osaka Kyoiku University, as an assistant professor (1991-2000) and associate professor (2001-2008). From 2000 to 2001, he was with Karl Anker Jørgensen's group at Århus (Aarhus) University in Denmark. He worked at the Center for Collaborative Research, Anan National College of Technology as an associate professor from 2008 to 2009. Then, he moved to the School of Environmental Science and Engineering, Kochi University of Technology in 2009, where he has been a professor since 2011. His research interests comprise synthetic organic chemistry using nitro compounds, heterocycles (synthesis, ring transformation, 1,3-dipolar cycloaddition, application as tools in organic synthesis), pseudo-intramolecular reactions.