

Chemistry Chat

Nine Short Stories - Part 3 -

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As you can see from the fact that Tokyo Chemical Industry Co., Ltd. sells more than 30,000 products, there are many different types of reagents. Naturally, the properties of the reagents vary widely. While some reagents can be handled without special care, others are vulnerable to moisture, oxygen, light, and heat and need to be handled with care. This time, I would like to talk about the storage of reagents.

Story 7. The veil of mystery

When Fumiko found the desired halogen compound in the reagent cabinet, she noticed the bottle was wrapped in black paper unlike the other reagent bottles. When she weighed the reagent on the balance, the black paper was in the way. Thus, Fumiko tore off the annoying paper. At this time, the reaction proceeded efficiently, but the yield of the product decreased with each reaction, and finally the reaction did not proceed at all.

⇒ Some of the reagents decompose when exposed to light. A brown bottle can often inhibit decomposition, but some of them are sensitive, and in such cases, they may be wrapped in black paper to protect them from light. Fumiko removed it because it was in the way of taking the reagent from the bottle. So, it is no wonder that **the reagent in the bottle was decomposing and the reaction was no longer proceeding**. Fumiko may think the bottle was shrouded in a veil of mystery, but the reagent manufacturers are not doing this to harass users, they are doing it for a good reason. If you are not sure, you should not act on your own judgment, but should consult with a professor.

Story 8. Time sense

Lab members were organizing the reagents stored in the laboratory. This included not only the reagent racks but also the reagents stored in a refrigerator. Mizuki was in charge of the refrigerator. He took out the reagents and put them on the lab bench and continued to check the labels with his colleague against the storage list. If the letters on the labels were hard to read, he would replace them with new ones. Mizuki picked up a bottle with an illegible label and tried to read the name of the reagent. At that moment, the lid blew off with a clunk and the reagent inside blew up vigorously, leaving a brown stain on the ceiling.

⇒ Some reagents are heat-sensitive and decompose. Such reagents are designated for refrigerated or frozen storage, so a refrigerator is necessary in laboratories. Mizuki considered that **they would be fine for a short period of time and put them on the lab bench, but it must have been too long, long enough for the reagents to decompose**. Since the reagent reached the ceiling, the inside of the bottle must have been pressurized to a very high level. If the bottle had been facing Mizuki, it might have brought about a horrible accident that I do not even want to imagine.

Story 9. Rusting atmosphere

Fumiko finished using acid chloride for her reaction, and returned the reagent bottle to the reagent rack. The next morning, when Fumiko looked in the reagent rack to take out the reagent, she found something brown, unlike yesterday. The metal rods to prevent the reagent bottles from tipping over were all rusty. Looking at the reagent bottle she used yesterday, she saw that the lid was a little loose and water drops were adhered to it. Fumiko understood it was obviously her own fault. She apologized to the other members and asked them to help her remove the rust of the metal rod.

⇒ There is an old haiku like “a razor rusts in one night on the rainy day in May”. Indeed, rust can occur overnight if conditions are proper, such as humidity and temperature. In addition, the formation of rust is accelerated when the metal surface is exposed to acid corrosion. **If the lid of a bottle of acid chloride is loose, the moisture in the air will decompose it, producing hydrogen chloride, and the next day any metal surface may be covered in rust.** The lid of the reagent bottle must be tightened and further wrapped with tape. If space is available, it may be a good idea to store such reagents in a draft chamber. As much as possible, you do not want to make a mistake that would cause problems for others.

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), and pseudo-intramolecular reactions.