



PROPER USE OF CHEMICAL REAGENTS IN TEACHING CHEMISTRY

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Teaching chemistry is not only about imparting theoretical knowledge but also about developing practical skills, as it is an experimental science. Chemical reagents play a crucial role as the primary tools for conducting chemical experiments and reactions. The quality, properties, and proper usage of these reagents determine the success and effectiveness of experiments [1].

Proper use of chemical reagents in chemistry lessons ensures safe and efficient laboratory activities for students. At the same time, it provides students with opportunities to understand chemical processes, observe their properties, and reinforce theoretical knowledge through practical application. There are various types of reagents, including ultra-pure, chemically pure, analytical grade, purified, and technical grade, each with specific applications and safety requirements [2].

It is essential for students to learn safety rules, understand the chemical properties of reagents, and avoid incorrect mixing during laboratory work. Therefore, the correct use of chemical reagents in teaching chemistry not only ensures the safe and effective conduct of laboratory experiments but also contributes to a deeper understanding of the subject by students [3].

Chemistry, as an experimental science, relies heavily on the proper use of chemical reagents. Reagents serve as the primary materials for conducting a wide range of chemical reactions. They vary in purity and application, including ultra-pure, chemically pure, analytical grade, purified, and technical grade reagents. Each type has specific properties and safety requirements, which must be strictly observed to ensure successful experiments and prevent hazards.

Proper handling includes understanding the chemical properties of reagents, using them in appropriate quantities, storing them in suitable containers, and avoiding incompatible mixtures. For example, aggressive acids, alkalis, and organic solvents require separate storage in chemical-resistant, airtight containers, away from heat, light, and moisture. Volatile and flammable substances such as acetone, alcohol, and gasoline must be handled in well-ventilated areas and stored in specialized containers designed



for flammable materials. Toxic substances, such as arsenic, mercury, and cadmium compounds, require careful handling, use of protective equipment, and restricted access to prevent health hazards.

In the educational context, teachers play a crucial role in instructing students on the correct use of reagents. They must explain the purpose of each reagent, safety procedures, and the principles of chemical reactions. Laboratory work allows students to apply theoretical knowledge practically, develop critical thinking, and gain skills in observing and analyzing chemical processes. Furthermore, incorporating modern pedagogical methods, such as problem-based learning and guided experiments, enhances students' engagement, safety awareness, and understanding of chemistry.

Correct reagent usage also emphasizes the importance of labeling, monitoring storage conditions, and maintaining reagent quality. Proper storage in light-protected containers, clearly marked with purity, usage, and storage instructions, prevents accidents and preserves reagent integrity. Through these practices, students learn not only the technical aspects of chemistry but also the significance of safety and responsibility in scientific work.

The correct use and safe storage of chemical reagents are fundamental to effective chemistry education. Proper handling ensures laboratory safety, reinforces theoretical knowledge, and allows students to actively engage in experimental work. Teachers who implement modern pedagogical approaches while emphasizing chemical safety help students develop practical skills, critical thinking, and a deeper understanding of chemistry. Understanding the chemical properties of reagents and adhering to safety measures is essential for preventing accidents and ensuring effective learning. Consequently, proper management of chemical reagents is a key factor in achieving high-quality education in chemistry and safeguarding students' health.

References

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