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Editorial

Editorial on Introduction to Green Chemistry

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INTRODUCTION

Green chemistry also known as sustainable energy is a branch of chemistry that formulates chemical products and processes to reduce or eliminate the use or synthesis of hazardous substances. Green chemistry is applicable across the life cycle of a chemical product, starting from its design, manufacture, and use to its ultimate disposal.

Green chemistry

- It prevents pollution at the molecular level
- It is applicable to all areas of chemistry, not a single discipline of chemistry
- Applies innovative scientific solutions to the existing environmental problems
- Results in source reduction as it prevents pollution
- Alleviates the negative impact of chemical products and processes on human health and the environment
- Lessens or eliminates hazards from existing products and processes
- Formulates chemical products and processes to reduce their intrinsic hazards

Green chemistry's 12 principles

These principles explain the in-depth concept of green chemistry:

1. Eliminate waste: Create chemical syntheses that are waste-free. It produces no waste that needs to be treated or cleaned up.

2. Maximize atom economy: The end product contains the maximum amount of the starting materials. Minimal or zero wastage of atoms.

3. Develop less dangerous chemical syntheses: Create syntheses that use and manufacture chemical compounds of little or no exposure to humans or the environment.

4. Design safer chemicals and products: Synthesize chemical products that are fully effective with little or no toxicity.

5. Use less hazardous solvents and reaction conditions: Does not use solvents, separation agents, or other auxiliary chemicals. It only uses safer goods when absolutely appropriate.

6. Increase energy efficiency: Energy requirements are considered for their environmental and economic impacts and minimized. Synthetic methods are conducted at ambient temperature and pressure.

7. Use renewable feedstocks: Use renewable starting materials rather than exhaustible. The source of renewable feedstocks is often agricultural products or the wastes of other processes while fossil or mining operations are the sources of exhaustible materials.

8. Avoid chemical derivatives: If at all necessary, avoid using blocking or shielding groups, as well as any temporary modifications. Derivatives require more reagents and produce waste.

9. Instead of stoichiometric reagents, use catalysts: Utilize catalytic reactions to minimise waste. Catalysts function in small quantities and can repeat a single reaction several times. They are superior to stoichiometric reagents, which are overused and only perform a single reaction.

10. Design chemicals and products to degrade after use: Create chemical products that degrade to harmless substances after use, preventing them from accumulating in the environment.

11. Analyze in real time to prevent pollution: During syntheses, provide in-process, real-time monitoring and control to reduce or eliminate byproduct creation..

12. Mitigate the risk of accidents: Chemicals and their physical forms (solid, liquid, or gas) should be designed to reduce the risk of chemical accidents such as explosions, fires, and environmental releases.

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