



The Entire World Should Know About Green Chemistry



A better quality
of living through
Green Chemistry

This article talks about a set of principles that can help us use chemicals in a way that will greatly improve our lives.

by Ruth Devlin / PAGE DESIGN BY MICHAEL TSE

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Most people don't think too much about chemicals, but actually they are all around us. Many substances consist of chemicals, including the air that we breathe and the water that we drink. Some chemicals are natural, but most of them are artificial and may be harmful to the human body.

In 2005, Hurricane Katrina struck the United States and destroyed hundreds of thousands of homes, so **displaced** people had to move into temporary housing. Later, some of them began experiencing headaches and nosebleeds due to formaldehyde exposure.

Talk About It

- What chemicals do you use in your home?
- What can you do to decrease pollution?

This **pungent** chemical is commonly found in the glue that holds many household products and pressed wood furniture together. It has been classified as a carcinogen since 2011 and has been linked to an increase in **asthma** and allergies in children. It has also been regulated as a toxic chemical by the Environmental Protection Administration in Taiwan.



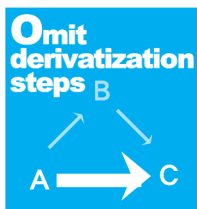
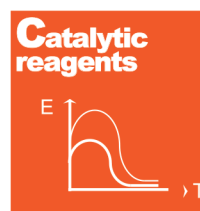
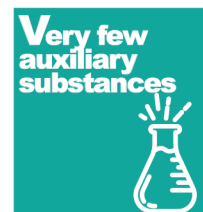


行政院環境保護署

毒物及化學物質局

Toxic and Chemical Substances Bureau,
Environmental Protection Administration Executive Yuan, R.O.C. (Taiwan)

THE 12 PRINCIPLES OF GREEN CHEMISTRY

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Usage Tip

*The 12 Principles of Green Chemistry **lay out** the goals of this approach to chemical research and the chemical industry. (p. 17, line 16)*

片語動詞 lay out something 有「攤開・排列；（大把）花（錢）」等含意，不過在這裡則是指「清楚地解釋」；通常表示以書寫的方式對某事進行闡釋。

• This job description is laid out in the personnel guide.

Your turn

However, there is another choice: natural adhesives. In particular, ones made from soy proteins that have been modified to resemble the protein some shellfish use to stick to rocks. A natural adhesive is now widely used in composite wood products in the U.S. Other companies are also developing more natural alternatives to **hazardous** industrial chemicals. This is a part of the Green Chemistry philosophy.

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Green Chemistry is a way of rethinking how to develop products and processes that are more environmentally friendly, better for people's health and yet are economically **feasible**. That includes reducing processing waste, using **renewable** materials and lessening the energy required to manufacture products. The 12 Principles of Green Chemistry lay out the goals of this approach to chemical research and the chemical industry. The first is prevention. It is better to prevent waste than to treat it or clean it up. Another principle encourages less hazardous chemical **synthesis**.





SAFETY



Word Bank

displace (v) [dr'ples] 迫使...離開常居地

The flood **displaced** several hundred people.

pungent (adj) ['pʌndʒənt] (氣味) 刺鼻的

I don't like that **pungent** smell.

asthma (n) ['æzmə] 氣喘, 哮喘

Asthma can make it difficult to breathe.

hazardous (adj) ['hæzə-dəs] 危險的

Be very careful with those **hazardous** materials.

feasible (adj) ['fɪzəbəl] 可行的; 做得到的

Buying a new car isn't **feasible** for us right now.

renewable (adj) ['rɪnuəbəl] (能源) 可再生的

Water is a **renewable** energy source.

spur (v) [spɜː] 激勵; 促進

A business tax cut is needed to **spur** economic growth.

sustainable (adj) [sə'stenəbəl] 可持續的

These men are learning **sustainable** farming practices.

More Information

formaldehyde (n) [fɔːr'mældə,haɪd] 甲醛

carcinogen (n) [kɑː'sɪnədʒən] 致癌物質

adhesive (n) [æd'hɪsɪv] 黏著劑

composite (n) [kəm'pəzɪt] 複合材料

synthesis (n) ['sɪnθɪsɪs] 合成

petrochemical (n) [ˌpetro'kɛmɪkəl] 石油化學製品

Word Bank Focus

renew (v) ['rɪnu] 重新開始

There is nothing so special as the chance to **renew** an old friendship.

renewal (n) ['rɪnuəl] 更新

The contract **renewal** will be based on several factors.

Key Points

Complete the sentences below.

- Most chemicals are _____ and may be _____ to the human body.
- Green Chemistry can decrease _____ and increase the sustainable _____ of the earth.

(Suggested answers on page 74)

Chemical reactions should be designed to be as safe as possible. Energy efficiency is encouraged as well as using chemicals made from renewable plant-based sources rather than petrochemical ones. Attention also needs to be paid to monitoring pollution in real time and choosing and developing chemical procedures that are safer and that minimize the risk of accidents.

There are challenges in meeting and holding to the principles of Green Chemistry, but this will **spur** new research and inspire the discovery of new chemistry. Green Chemistry can decrease pollution and increase the **sustainable** development of the earth, thus improving the quality of life for humans and animals for years to come. 🦉

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