



CHEMISTRY AND CONSUMER PRODUCTS

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ABSTRACT

It is almost impossible to comprehend all the products of chemistry that enrich our lives. It would be befitting to say that the ways in which the modern life differs most from that of earlier times resulted from the various applications of chemistry in our daily lives. The food we eat, the air we breathe, the clothes we wear, the medication we take are chemicals. Our lives are transformed by chemical discoveries such as: polymers, pharmaceuticals, insecticides, optical glass, ceramics, computer chips, cosmetics, adhesives, transport fuels and fertility agents. We live in beautifully furnished and decorated houses and apartments constructed using chemical products, metal alloys and chemical paints. The food we eat supplies the chemicals necessary to sustain life. Our foods and farm produce are chemically tested for purity, vitaminized, packaged and refrigerated for protection. We buy medicines and drugs, cosmetics, cleaners, coatings, fertilizers, pesticides, and fuel in enormous quantities, for their chemical action. We were clothing made of synthetic fibres and synthetic dyes and use soaps, detergents and toothpastes designed by chemists. The morning news paper is a printed on paper with inks manufactured by a chemical process with colourful pictures made possible by chemists. Our means of communications and transportation are heavily depended on the products of chemistry. There are different brands of a product available in supermarkets. The most expensive brand may or may not necessarily be better than others. Cosmetics, soaps and detergent industries do a lot of advertising for their brands of products claiming superiority of their brands even though most of the brands are more or less similar in quality. Expensive advertising adds to the widely advertised brands thus making them dearer. Most highly advertised cosmetics and toiletries are made from similar and inexpensive ingredients and yet may have extremely expensive price tags because of fancy container and a label showing picture of a famous model.

KEYWORDS: Chemicals, chemical reactions, Recreation, Formulations, Corrosion, Semi-conductors.

INTRODUCTION

Chemistry plays an important role in the discovery and understanding of materials contained in these and many other common household items. Things like household cleaners and water purification systems are vitally dependent on chemistry. Without chemistry something as simple as scrubbing a toilet without fear of severe burns or small explosions might not be possible. Next, though it isn't widely known, chemistry is also heavily involved with the manufacturing of things such as makeup and soap. Each time you bathe you are witnessing chemistry at work. Chemicals such as acetyl alcohol and propylene glycol are ingredients in the soap used to wash your hair and skin. Without chemistry, these materials might be hazardous or might not exist. The chemical colouring agents used in makeup and nail polish would not be possible without an understanding of the chemicals involved. Almost anything you do during the course of a normal day involves chemistry in some way. the gas and tires in cars we drive, the makeup we put on our faces,

the soap sand cleaners used every day, burning wood or other fossil fuels, chemistry is all around you each and every day.

The importance of chemistry we are surrounded everyday by chemistry. Chemistry was responsible for your car to get you to work, your furnace to heat your home, and your body to turn your breakfast into energy. The coke you drank with your lunch was flavoured by chemistry. chemistry is often called the central science; be they discovered by mixing some twenty odd chemicals together they could flavour something with the flavour of peaches without that item of food coming in contact with a single peach. When we tan is the sun it is a chemical reaction between our skin and the UV rays of the sun. Cause it is vital in the sciences of physics and biology. Blend together a few different chemicals and you can create a pleasant smelling liquid, thus revolutionizing the perfume industry. For example a living organism is a complex chemical factory; by understanding the chemical behaviour scientists can find

new ways to treat disease. Chemists have even made it possible to produce crops of food plants that are hardier than the parent strains. Chemists use their knowledge of the properties of this reaction to create effective sunscreen. Chemists discovered certain compounds can be used as a non-toxic food preservative. Chemists have been able to make lots of useful inventions by using their knowledge of chemistry.

Chemistry in Recreation

Chemistry plays a prominent role in recreation and sports. It enhances quality of life by providing different types of photography, musical instruments, records, video- and audio tapes, compact discs, computer diskettes and television sets, which are all products of chemistry.

Chemistry and sports

Rugby ball, foot ball, helmets (for football and car and motor cycle race), running shoes, skis, skates, all use modern polymers, plastics, ceramic, alloys and paints and coatings. Tennis racquets, golf club and finishing rods are made from graphite-reinforced epoxy resins. Golf balls are product of a superior synthetic rubber. Racing cars and boats are made of fibre glass-reinforced polyester plastics. Enjoyment of camping in nature is made possible by products of modern chemistry, which provide tents and other materials of use. Swimming pools are kept in healthy atmosphere by use of chemical disinfectants.

Deep ocean divers are supplied a mixture of helium and oxygen instead of air for breathing. Air proves harmful when the diver goes deep into water. On coming to the surface again bubbles of the free gas collect at the joints and cause pains.

Sand and Chemistry

The sand at the beach is not only important for building sand castles. But it has various uses in our daily lives besides being used as sand paper. Sand is a combination of silicon and oxygen and it is the silicon, which makes this compound so interesting and useful.

Silicon is found in glasses, ceramics (like pottery), and cement. Silicon is also used to make computer chips and other electronics devices, which are commonly known as "semiconductors." This same element can be, under the right conditions and when mixed with the right chemicals, become a major constituent in rubbery or greasy compounds known as "silicones". Example of silicones include car waxes, caulks for sealing cracks, adhesives for tiles and plastics, the rubbery base for some chewing gums, plastic surgery, and the soles of an astronaut's boots. In some cases, silicones act like liquids and are called "silicone oils". Silicone oils are used as lubricants at temperatures where normal greases and oils no longer work properly and/or in cases where resistance to moisture is important. Silicone oil is used as brake fluid in motor vehicles.

Safety Matches

The common raw materials for the match industry are: soft wood splints; match-head contains sulphur, charcoal, antimony trisulphide, paraffin wax (combustible substances); red lead, manganese dioxide or potassium dichromate (oxidising agents); and gum (binding material). Chemicals on the rubbing-surface material include: red phosphorous, antimony sulphide, ground glass (cause friction) and binding materials like gum, glue, or starch. Heat is produced by friction, which results in the burning of combustible components on the match-head.

Mosquito Coils

The growing menace of mosquitoes has forced people to turn to mosquito repellents in the form of coils, mats, body lotions and creams. Pyrethrum which contains a mixture of pleasant-smelling esters called the pyrethrins, has highly unusual insecticidal properties. It is unique in its ability to repel most insect pests while posing virtually no threat to the environment. Pyrethrin is extracted from chrysanthemum plant, *Dendranthemum (chrysanthemum) cinerariaefolium*, which is grown primarily in Kenya, Rwanda, Tanzania and Ecuador. Pyrethrins are mixed with a synergist such as piperonyl butoxide to increase insect mortality, by affecting central nervous system of insects.

Pyrethroids (allethrin, d-allethrin, d-transallethrin bioallethrin and esbioallethrin) are synthetic materials designed to imitate natural pyrethrum and are effective in controlling the mosquitoes. These are biodegradable and disintegrate in sunlight. Mosquito coils contain 0.2--0.5% pyrethrins or 0.1% d-allethrin in a range of fragrances such as regular, sandal, rose, and lavender. Water-based formulations are used as home and garden insect spray and as pet shampoos for effective control of fleas, ticks, lice on domestic animals.

METALS AND METAL-ALLOYS

Indians, Chinese and Egyptians knew the art of making iron and steel. Iron implements about 5000 years old have been excavated. Iron is widely used in machinery construction of buildings, bridges, railings, vehicles, lamp posts, nails, wire, pin, needles, horseshoes and agricultural implements. Structural materials for all industries use mainly iron in the form of steel.

The galvanized sheet of iron (coated with a thin layer of zinc) is used for making buckets, boxes and roofing. Nickel steel (3-5% nickel) is most suitable for making armour plate, wire and propeller blades of aeroplanes. It is used for building bridges, in construction work and for making crankshafts. High chromium steel (containing 12% chromium) is used for making stainless cutlery. Stainless steel (8% nickel, 18% chromium) is highly resistant to corrosion and is used for making tableware and knives and kitchen utensils. Manganese steel (12-14% manganese) is used in the manufacture of grinding machinery, rock crushers and burglar proof safes.

Tungsten steel (18% tungsten) is used for making high-speed tools.

Aluminium is widely used in modern homes for making doors, windows and electric cables. Being non-toxic, it is ideal for packaging food, making saucepans and cooking foil. On account of lightness, alloys of aluminium are used for construction of aeroplanes, ships small boats and parts of cars.

Copper is widely used: for making electric cables and other electrical goods, pipes cooking ware, evaporating pots, roofing material. The alloys of copper are: coinage metal (25%nickel), brass (20% zinc) and, bronze (10% tin).

Common Salts

Common salt (sodium chloride, table salt) is largely extracted from sea water. It is also called rock-salt since it occurs in the form of rocks. Seawater is the richest source of sodium chloride. In tropical countries, the seawater is run into shallow tanks or lagoons and left to evaporate in the sun. The solid crust of the salt thus formed is harvested and the crystals are allowed to stand in heaps exposed to occasional showers, so that magnesium chloride sticking to it is leached out. The salt is dissolved in water and its saturated solution is filtered to remove suspended matter and then subjected to a "salting out process", using chlorine to obtain pure white crystals of sodium chloride.

In cold countries, the sea water is stored in small pits and left to freeze in the night. About 90% water freezes into ice, leaving behind saturated brine, which is separately evaporated and the solid sodium chloride is recovered.

Common salt contains 97-99% sodium chloride with calcium chloride and magnesium chloride as impurities. Commercially available salts are iodised by addition of a small amount of sodium iodide.

Electroplating

It is an important industrial application in which copper, silver, chromium and gold are extensively used. The cheap ornaments, medals, prize cups and cases of watches are electroplated with silver or gold to look as superior as the pure metal. Articles of decoration like flower vases, curios, fine cutlery and utensils are plated with metals like nickels, chromium and silver. A hard metal like chromium is used on dies, gauges and bearings to prevent abrasion and wear. Mobile parts of motors and machinery are also thickly coated with chromium to prevent wear on account of friction.

Chemistry of Batteries/Cells

Dry cells are used in torches, portable radios and calculators. Lead storage batteries are used in motor cars and motor cycles. Both these types of common cells are known as electrochemical cells. In dry cells, the outer casing act as the anode (+ve), and is made up of zinc. A

central rod completes the circuit as cathode (-ve). The space between the two electrodes is filled with substances, which include water, ammonium chloride. Manganese di oxide and zinc chloride.

Lead storage battery consists of an anode of lead metal and a cathode of lead oxide. The electrodes are surrounded by an aqueous solution of sulphuric acid, which is used up during the use of battery, and lead sulphate is formed at both electrodes as an insoluble white coating. Eventually the battery would become dead when the electrodes become completely covered. Passing a current in the reverse direction can recharge the battery.

Alkaline battery, built much like the carbon-zinc battery contains potassium hydroxide and delivers about 1.5 volts, but as a longer life time. Other more specialized batteries include light weight lithium battery, which provides over 3 volts, Mercury battery, nickel-Cadmium battery and the small and long-live, silver oxide battery, which provides about 1.5 volts.

Solar cells consist of a standard photovoltaic (PV) cell, which is manufactured from two layers of a semi conducting material, Such as silicon. Each layer is doped tiny amounts of different impurities, usually phosphorous and boron, which produced an electrostatic field between two layers. PV cells converts sunlight directly to electricity using a phenomenon known as the photo voltaic affect. By using new semi conducting materials with higher photo voltaic efficiencies (such as Gallium arsenide, indium phosphide, and cadmium telluride), the Efficiency of PV cells can be increased. Later have shown efficiencies of around 30% against 12% efficiency of standard PV cells.

CONCLUSION

Chemistry has applications in medical drugs, product development and a variety of different industries. Chemistry has influenced our life so much that we do not even realise that we come across chemicals at every moment that we ourselves are beautiful chemicals creations and all our activities are controlled by chemicals. There are many benefits that we get from chemical substances. Chemicals substances make our life easier and develop our quality of life. Chemistry is needed for the continual advancement of technology by using the principles of chemistry we are able to extract different types of consumer products and fulfill our lives.

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