

# Chemistry of Household Products

## I. Cleaning Products

- A. polar – when a molecule has a positive and negative pole on different ends of a molecule.
- B. polar molecules act like tiny little magnets, able to attract other polar molecules.
- C. nonpolar molecules have no magnetic property, but can attract other nonpolar molecules.
- D. soap molecules have both a polar and nonpolar end – suitable for attracting other nonpolar molecules like grease.
- E. soap is a surfactant because it interacts with the surfaces of other materials.

## II. Colloids and Suspensions

- A. If there is too much soap in the water, the polar ends of the soap crowd out other molecules and prevent grease from forming a suspension on water.
- B. Colloidal Suspension – a mixture of finely divided molecules evenly distributed throughout the one another.
- C. An emulsifier can be added to some suspensions to cause the two compounds to bond with each other even though they normally would not do so. Such a compound is called an emulsifier.

## III. Hard Water

- A. Metal ions in well water will bond with soap to form a greasy scum that may leave a ring on sinks and bathtubs.

- B. Synthetic detergents like alkylbenzenesulfonates do NOT react with the metal ions in hard water.
- C. However, these compounds could not be broken down once they entered the environments and left suds wherever they travel.
- D. Detergents are now made that have more of a straight chain – they are easier to break down by the environment.

#### IV. Corrosive Cleaners

- A. Drain cleaners contain sodium hydroxide – a compound that dissolves well in water and releases a lot of heat.
- B. In turn, this can cause clogged material like hair and grease to dissolve with the sodium hydroxide and flush down the drain.

## V. Hair Products

- A. Hair is kept moist by the body by releasing an oily substance called sebum – which can accumulate and attract dirt and greases to the hair.
- B. Compounds like sodium lauryl sulfate are surfactants that remove the sebum from the hair.
- C. Conditioners may be added to remove the sodium lauryl sulfate – which can make the hair look dull if it builds up over time.
- D. Hair usually has two pigments – melanin and phaeomelanin. Hydrogen peroxide is often added to hair to remove these pigments and lighten the hair.
- E. Dyes only cover the surface of the hair, and even though they are large molecules they will wash out over time.

## VI. Skin Products

- A. Creams and lotions designed to keep the skin moist are usually emulsions of oil and water. Oils used are lanolin (sheep's wool oil), olive oil, and others.
  
- B. Sunscreen contains extra compounds to help absorb ultraviolet light – the component of the sunlight that tans (burns the skin).
  
- C. UV-B is a form of ultraviolet that can cause permanent skin aging and cancers.

## VII. Eliminating Unpleasant Odors

- A. Perfumes – many of the scents that were once extracted from plants and animals can now be recreated in a lab.

- B. Different “notes” or parts of a perfume are used so different scents are detected after a certain period of time.
  
- C. Deodorants – contain antibacterial agents like triclosan that prevent the body odor smell (perspiration itself has little to no odor).
  
- D. Aluminum chlorohydrates also reduce sweating by restricting the function of sweat glands.