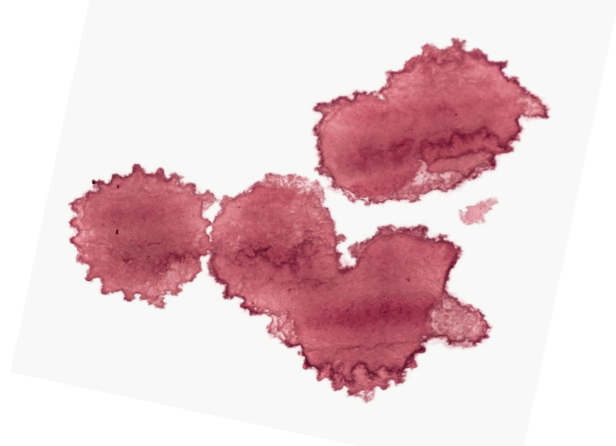


THE CHEMISTRY OF STAIN REMOVAL

A number of substances can stain clothes or furnishings, and some can be stubborn to remove. A range of chemicals can help do the job, varying depending on the type of stain. Stains will often have more than one characteristic, meaning a mix of these agents is often used to facilitate their removal.



ENZYMATIC STAINS

Blood, grass, chocolate



OXIDISABLE STAINS

Tea, coffee, red wine



GREASY STAINS

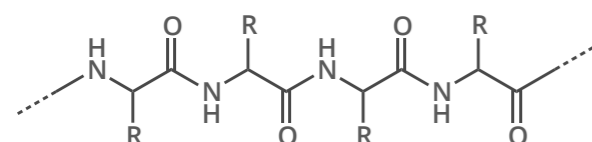
Oil, collar stains, butter



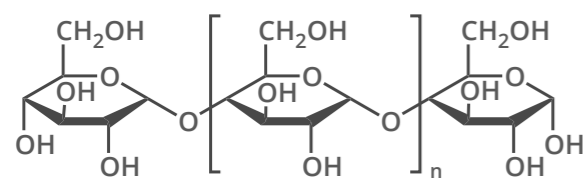
PARTICULATE STAINS

Mud, soil, dirt

ENZYMES



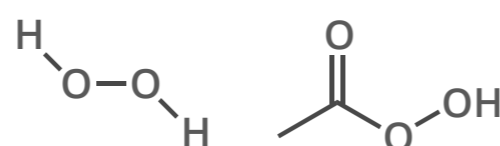
EXAMPLE PROTEIN MOLECULE SECTION



STARCH MOLECULE

Enzyme-based agents help to break down proteins, starches and fats by breaking up the large, insoluble molecules into smaller, more soluble ones. Proteases break down proteins, amylases break down starch, and lipases break down fats.

BLEACHES

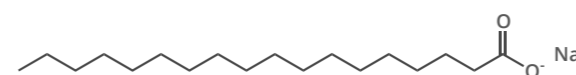


HYDROGEN PEROXIDE & PERACETIC ACID

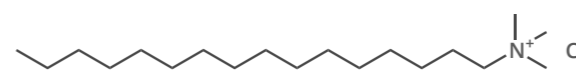
Oxidise coloured substances to colourless ones by breaking down chromophores, sections of chemical structures that can cause colouration. Bleaches are often either oxygen-based or chlorine-based.

The oxidising agent in oxygen-based bleaches is hydrogen peroxide; this is less effective below 40°C, so the compound tetraacetylenediamine (TAED) is included to produce peracetic acid, a better oxidising agent.

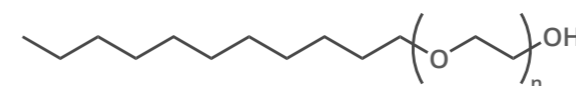
SURFACTANTS



SODIUM STEARATE
Anionic surfactant



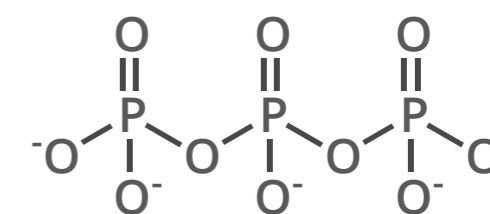
HEXADECYLTRIMETHYLAMMONIUM CHLORIDE
Cationic surfactant



POLYETHYLENE ETHOXYLATE
Nonionic surfactant

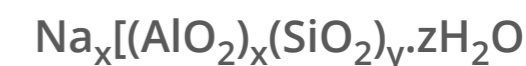
Surfactants help oils and grease dissolve in water. They are molecules that have a water-soluble 'head' and a oil-soluble 'tail'. They form spherical structures called micelles around oil droplets, which then allows them to dissolve in water.

BUILDERS



TRIPHOSPHATE (ABOVE)

Triphosphates used to be commonly used as builders in detergents. Due to the environmental impact of phosphates, many modern detergents are now turning to zeolites.



GENERAL FORMULA OF BUILDER ZEOLITES

Builders are compounds that help soften hard water by removing calcium and magnesium ions. This helps remove soil molecules, as they are often bound to fabrics by calcium ion bridging. They also enhance the action of surfactants.

