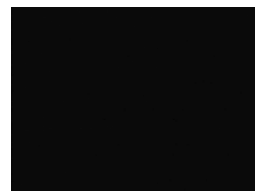


Synthetic Polymers "Plastics"

<https://www.youtube.com/watch?v=PSxihhBzCjk>
The Graduate: Dustin Hoffman (1967)

Polymers



Polymers

Macromolecules which are made from small molecules, monomers, or co-monomers which structurally repeat themselves.

Monomer

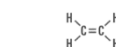
Ethylene & Propylene
Styrene
Vinyl chloride

Co-monomers

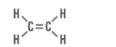
Polymer

Polyethylene & Polypropylene
Polystyrene
PVC
Nylon
(Proteins)

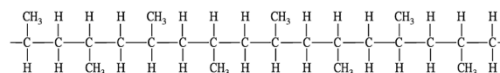
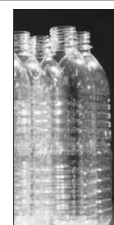
Polyethylene & Polypropylene Polymerization Mechanism



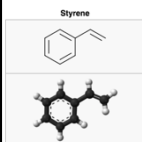
RO-OR



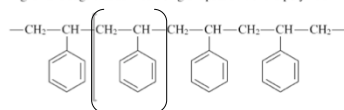
Initiation



Polystyrene & Others



⊙ Addition polymers result from the rapid addition of one molecule at a time to a reactive cation, radical, or anion intermediate at the growing end of the chain. The monomers are usually alkenes. Click on the right-hand edge that defines a single repeat unit of the polymer.



Nylon

A macromolecule which is a poly-amide.

Synthesis of Nylon 610



https://www.youtube.com/watch?v=_6xINyWPpB8

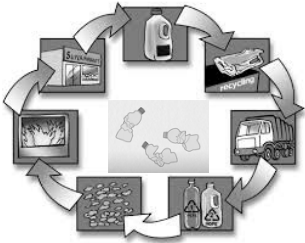
Plastic Waste / Recycling



~300 billion pounds produced annually,
Worldwide ~ 5% is recycled

Northern California
<https://www.norcalcompactors.net/processes-stages-benefits-plastic-recycling/>

Stages in Plastic Recycling



1. Sorting
2. Shredding
3. Identification and Classification
4. Extruding

https://www.youtube.com/watch?v=_6xINyWPpB8

<http://www.lotfi.net/recycle/plastic.html>

Recycling categories for common plastics

Plastic recycling number	Acronym and name of polymer	Original uses	Recycle uses
1	PET Poly(ethylene terephthalate)	Beverage bottles, food and cleaner bottles	Carpet fibers, landfill insulation, nonfood containers
2	HDPE High-density polyethylene	Milk, juice, water bottles, grocery bags, jugs	Oil and waste bottles, train cars, grocery bags, jugs
3	PVC for V Poly(vinyl chloride)	Food and water bottles, food wraps, blister packs, construction materials	Drainage pipes, flooring, traffic cones
4	LDPE Low-density polyethylene	Flexible bags for trash, bread, milk, groceries, flexible wraps and containers	Bags for trash, greenhouse, irrigation pipes, oil bottles
5	PP Polypropylene	Reusable bottle caps, lids, vehicle bumpers	Auto parts, fibers, geotextiles, insulation
6	PS Polystyrene	Styrofoam cups, packaging, laundry detergent bottles	Insulation, toys, trays, packaging materials
7	Other	Various	Plastic "timber", posts, fencing, pallets

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ONE MILLION plastic bottles are bought EVERY MINUTE around the world — and that number will top half a TRILLION by 2021. Less than half of those bottles end up getting recycled. 8 MILLION METRIC TONS of plastic winds up in our oceans each year.


<http://www.lotfi.net/recycle/plastic.html>

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<https://www.youtube.com/watch?v=1qT-rOXB6NI>

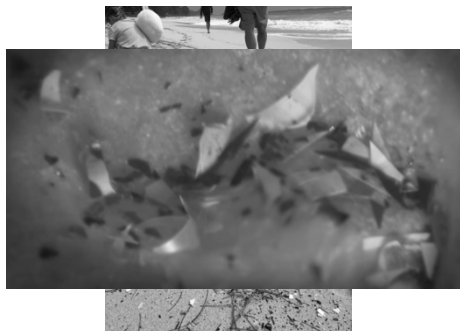
<https://www.youtube.com/watch?v=1qT-rOXB6NI>



North Pacific Gyre

There are 5 garbage patches

<https://www.youtube.com/watch?v=tG4AYagBz9Q>



Micro-plastics
Bellows Beach, Oahu, Hawaii

<https://www.sciencemag.org/news/2019/03/dead-whale-found-40-kilograms-plastic-its-guts>



D'BORE COLLECTOR MUSEUM

Dead whale found with 40 kilograms of plastic in its guts

By Alex Fox | Mar. 18, 2019, 4:15 PM

Name: _____
Organic Functional Group Sudoku Puzzle
Version 1.0
Craik, Thomas D., Myers, Stephanie A., J. Chen, Edm. 2007, 84, 612

The purpose of the organic puzzle was first published in the Journal of Organic Chemistry in 2007. The puzzle was designed to be a fun way to learn about organic chemistry. The puzzle was designed to be a fun way to learn about organic chemistry. The puzzle was designed to be a fun way to learn about organic chemistry.

The following Sudoku puzzle deals with the names and generic structures of organic functional groups based on organic chemistry. There are not clear directly with numbers as

	R-COOH					R-CONH ₂	R-NH ₂	R-CO-R'
R-NH ₂	R-Cl	R-CO-R'	R-OH			R-O-R'		
R-O-R'					R-COO-R'		R-Cl	R-OH
R-CO-R'								
R-COO-R'	R-OH		R-O-R'	R-NH ₂	R-CO-R'		R-COOH	R-CONH ₂
								R-O-R'
R-CONH ₂	R-CO-R'		R-COOH					R-Cl
		R-NH ₂			R-Cl	R-OH	R-CONH ₂	R-COO-R'
R-Cl	R-COO-R'	R-CHO					R-O-R'	

Poly-

ester
urethane
ethylene
propylene
styrene
vinyl chloride
vinyl alcohol
amide (Kevlar)
terephthalate
acrylonitrile
imide
phenylene-
bisisoxazole