APS110H1f2024 Oct 7, 2024

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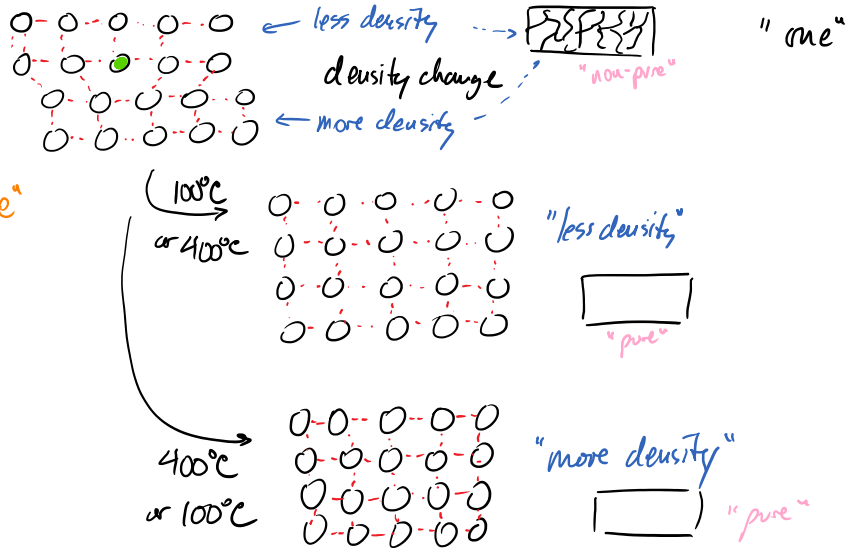
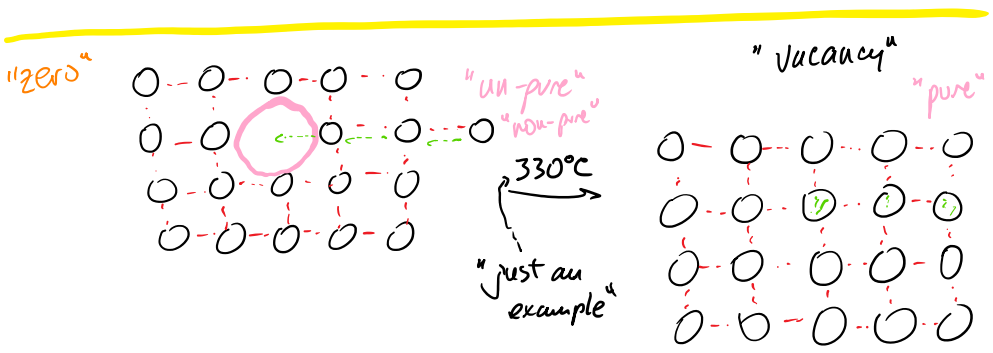
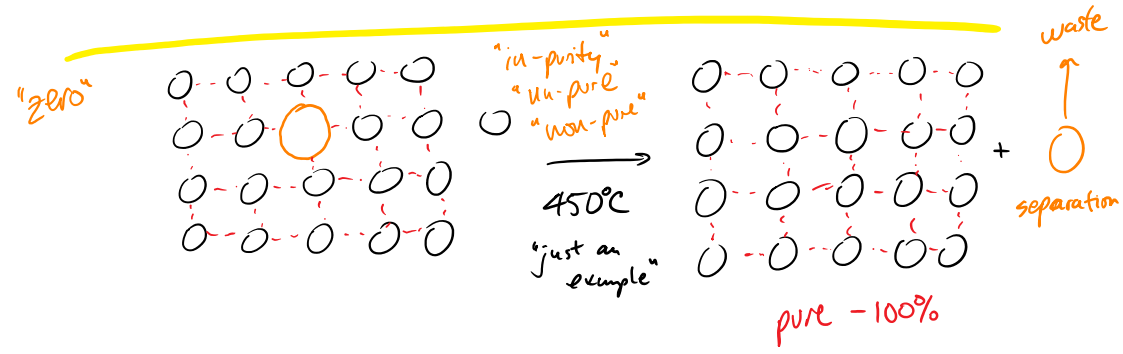
Thermodynamics and Kinetics

Crystalline Imperfections ⟶ nano-engineering of the structures

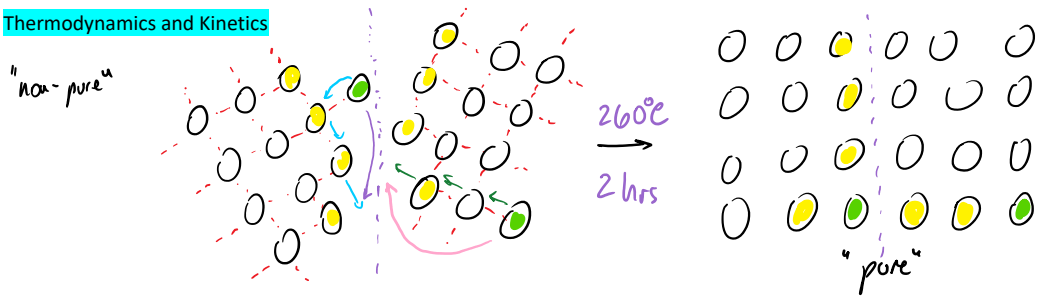
- Zero - dimensional - vacancy, impurity
- One - dislocation
- Two - grain, boundary

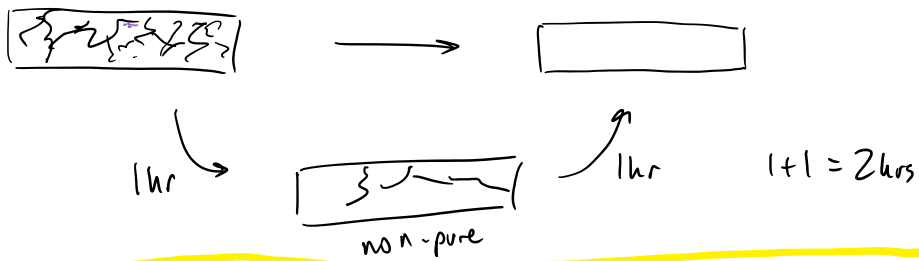


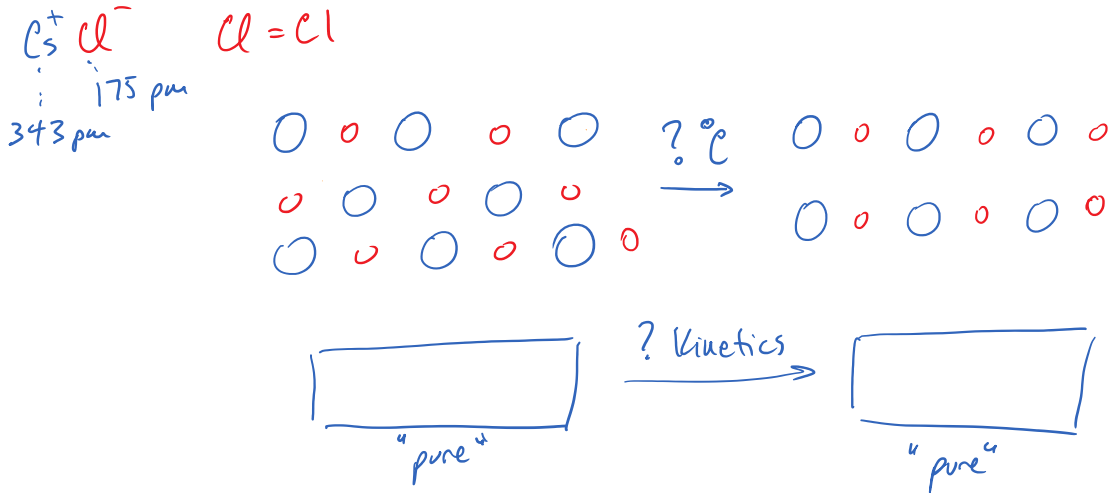


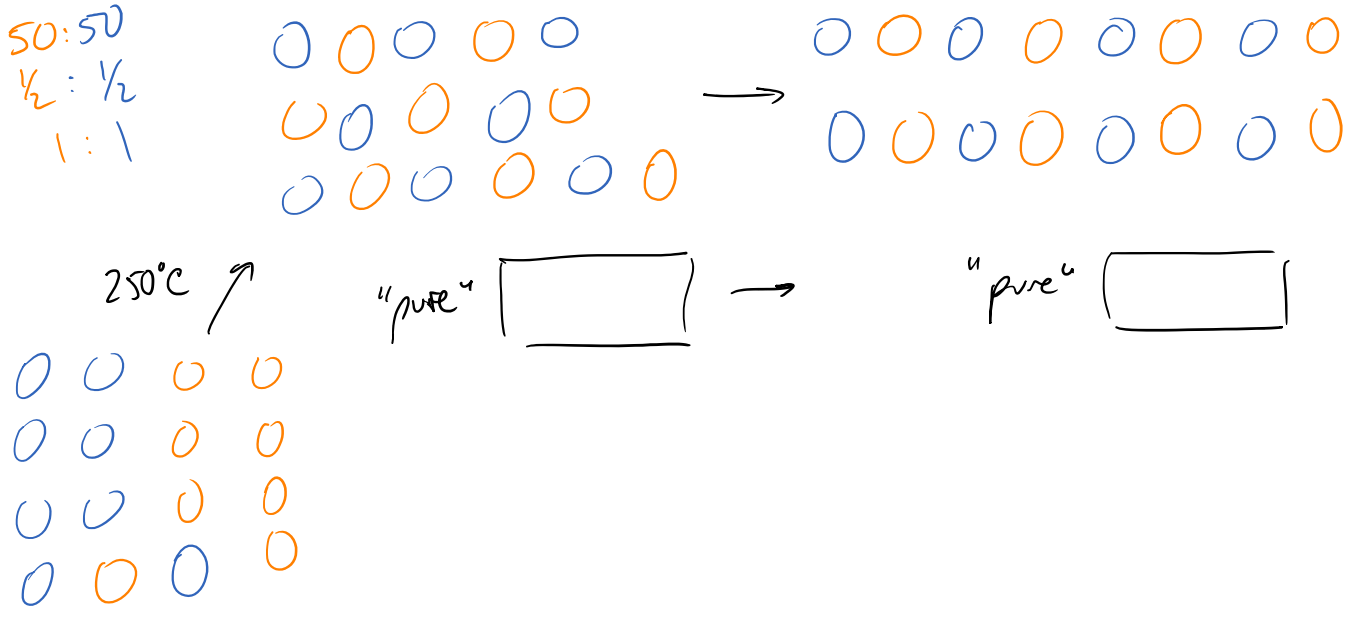


Thermodynamics and Kinetics









Polymer introduction

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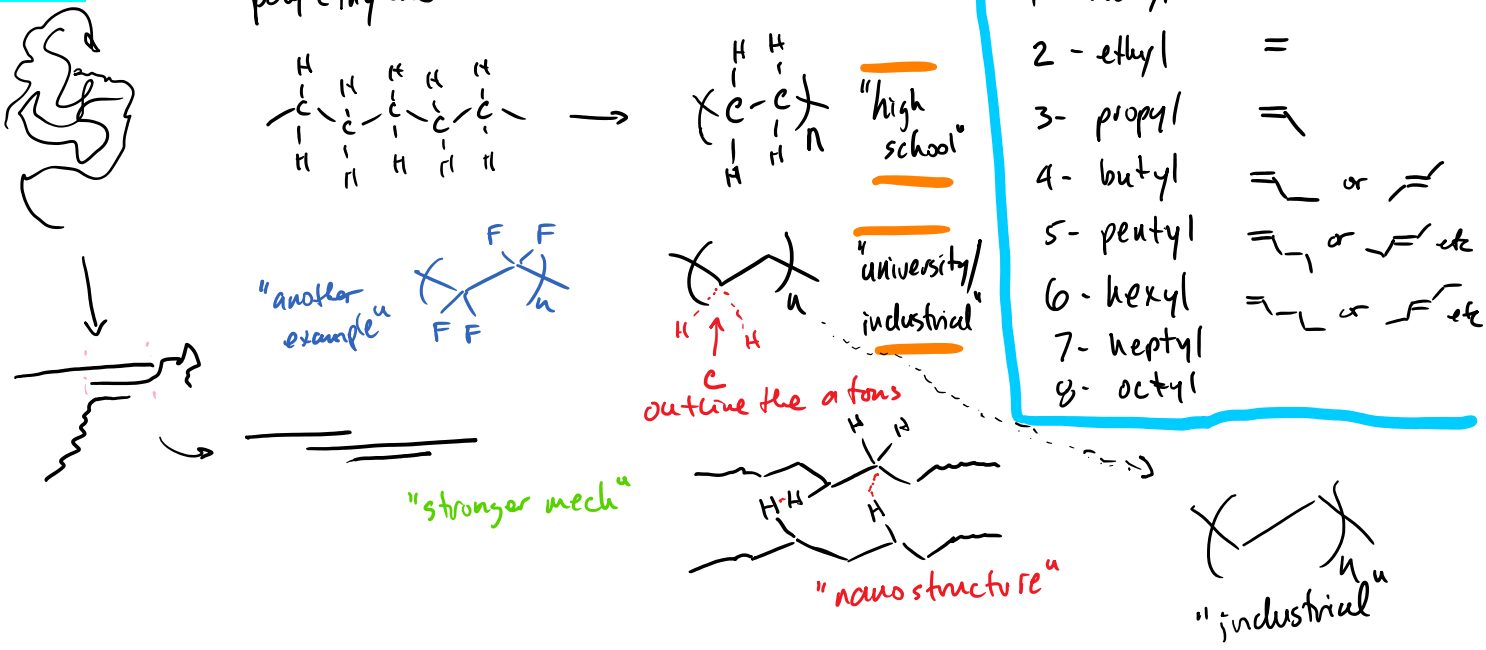
Polymer



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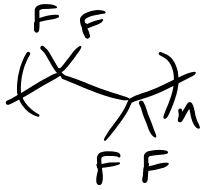
FYI = Monday Oct 21, 2024. mid-term

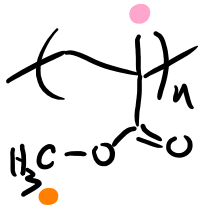
Introducing Polymers

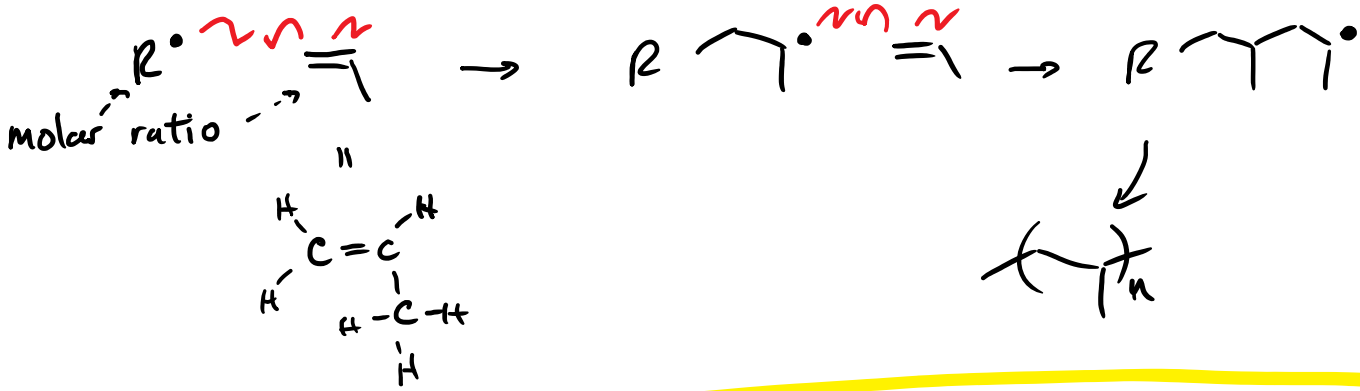
#4 poly tetra fluoro ethylene
= Teflon

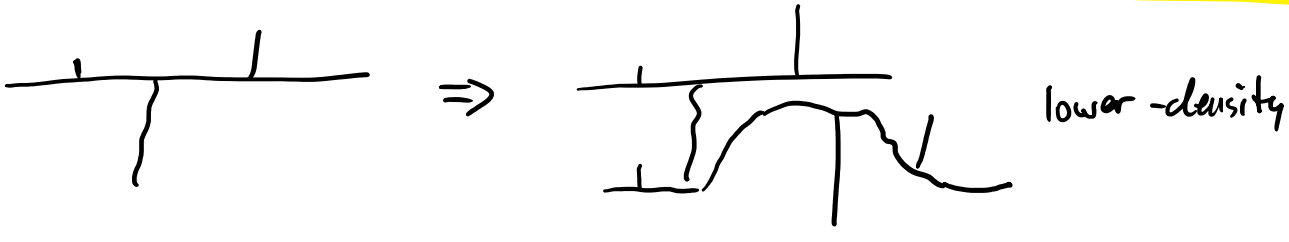


always linear

#5 poly methyl meth acrylate







cross-coupling  "higher density"

Recyclable Polymers

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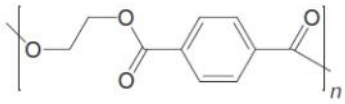
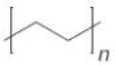
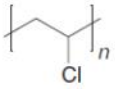
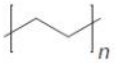
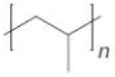
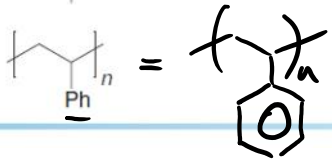
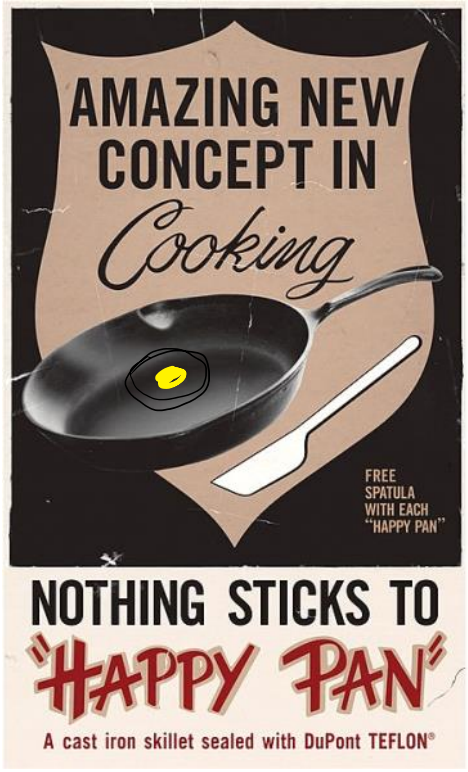
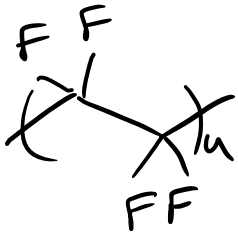
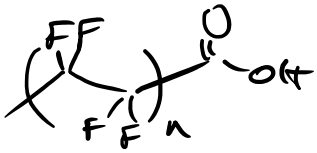
Table 30.1 Recyclable Polymers

Recycling code	Polymer name		Structure	Recycled product
1	PET Polyethylene terephthalate			fleece jackets carpeting plastic bottles
2	HDPE High-density polyethylene	#1		Tyvek insulation sports clothing
3	PVC Poly(vinyl chloride)	#3		floor mats
4	LDPE Low-density polyethylene	#1		trash bags
5	PP Polypropylene	#2		furniture
6	PS Polystyrene	#6		molded trays trash cans

Non-recycling - founded in 1930-1960s







environmental "impact"

to waste in the environment

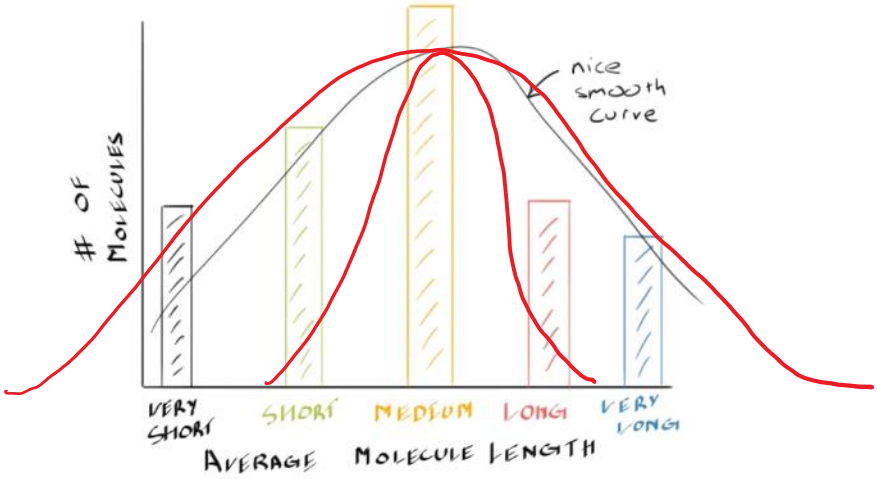


Figure 13. The molecular weight distribution for the hypothetical polymer sample in Figure 12. Our grouping into only five length groupings is very coarse and the actual distribution would be smooth, as shown by the nice smooth curve.

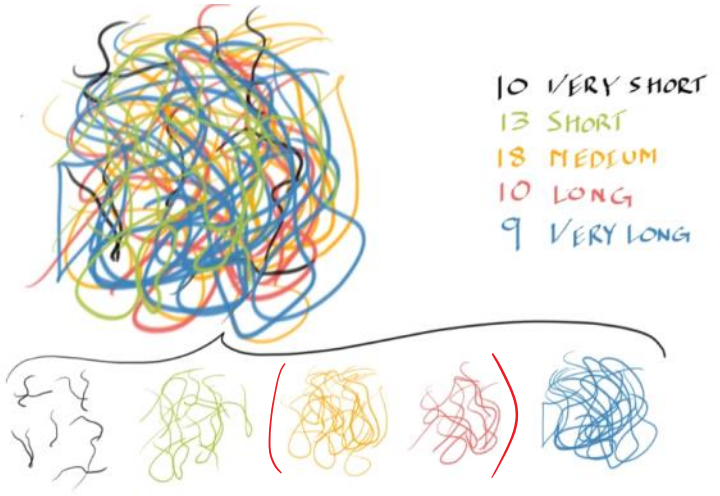


Figure 12. A hypothetical polymer sample consisting of some "very short" molecules, some "short" molecules, some "medium" molecules, some "long" molecules, and some "very long" molecules.