Demonstration of nylon synthesis:

\[
\text{soluble in hexane}
\]

\[
\text{soluble in water}
\]

reaction on the interface \(\rightarrow\) polymer forms

Student presentations - POLYMERS

**KEVLAR**

\[
\left[ C - \overset{\text{N}}{\text{N}} - \overset{\text{N}}{\text{N}} \right]_n
\]

condensation polymers

**NOMEX**

\[
\left[ C - \overset{\text{N}}{\text{N}} - \overset{\text{N}}{\text{N}} \right]_n
\]

**POLYURETHANE**

\[
\left[ C - \overset{\text{N}}{\text{N}} - \overset{\text{N}}{\text{N}} - \overset{\text{O}}{\text{O}} \right]_n
\]
Synthesis of polyurethane:

\[
\begin{align*}
0 = C &\equiv N - \text{[diisocyanate]} - N = C = 0 \\
&\downarrow \\
&\text{[diol]} \\
&\text{[urethane link]} \\
\end{align*}
\]

Polyethylene synthesis - continue from last class

+ Overheads are on the class website
+ Trashbags are polyethylene (PE)

Radical chain polymerization:
- Initiation
- Chain growth
- Termination

Low density polyethylene: branched polymer
- C4 side chain units
Ziegler-Natta Catalysis

\[ \text{TiCl}_3 \quad \text{Me}_3 \text{Al} \]

\[ \text{Li}^+ \text{Al}-\text{CH}_3 \]

no branches - high density polyethylene
like milk bottles

Other polymers of interest:

+ polypropylene
+ polystyrene radical mechanism
random array of stereoisomery

Cross links: attach individual chains together

\[ \text{divinyl benzene} \]
Polyvinyl Chloride

\[ \text{CH}_2=\text{CH} \quad \text{Cl} \]

Vinyl chloride

used in pipes

Tygon tubing

Polyvinyl Acetate

Polyvinyl Alcohol

TEFLON TFE tetrafluoro ethylene

\[ \text{CF}_2 = \text{CF}_2 \]

Monomer

non-stick cookware

Condensation Polymers:

combine different functional groups

loss of H2O upon condensation

Polyesters - PARCON

- KODEL

Spandex: isocyanate -> urethane