



# CHEMISTRY, COMPARISONS and FACTS regarding

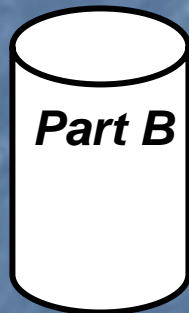


**POLYURETHANES**  
**and**  
**POLYUREAS**

# CHEMISTRY



+



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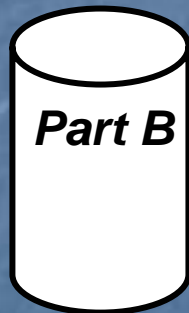
**POLYURETHANE**

Isocyanate

**Polyol**



+



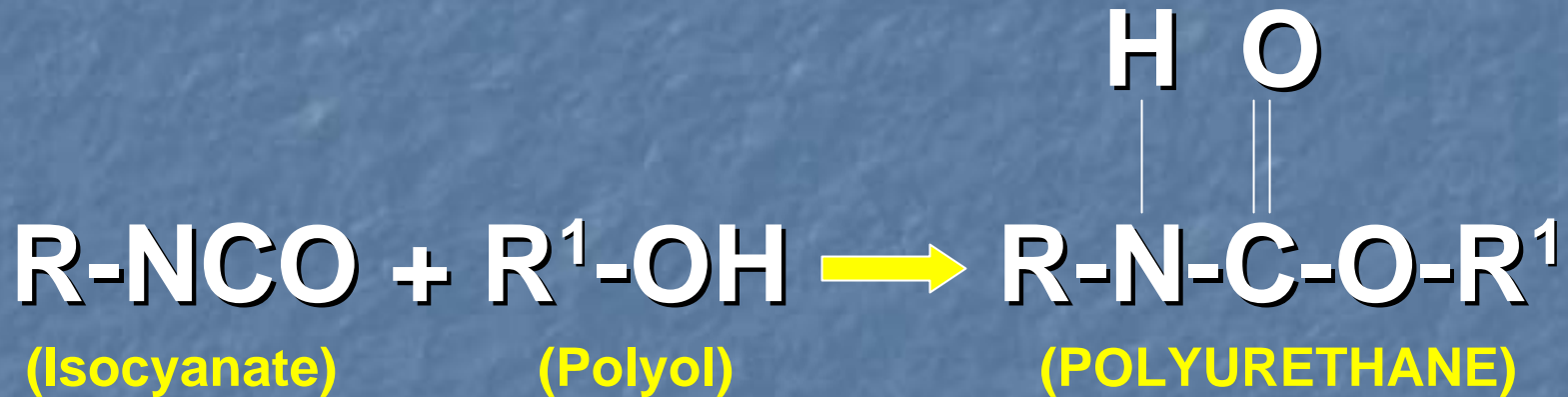
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**POLYUREA**

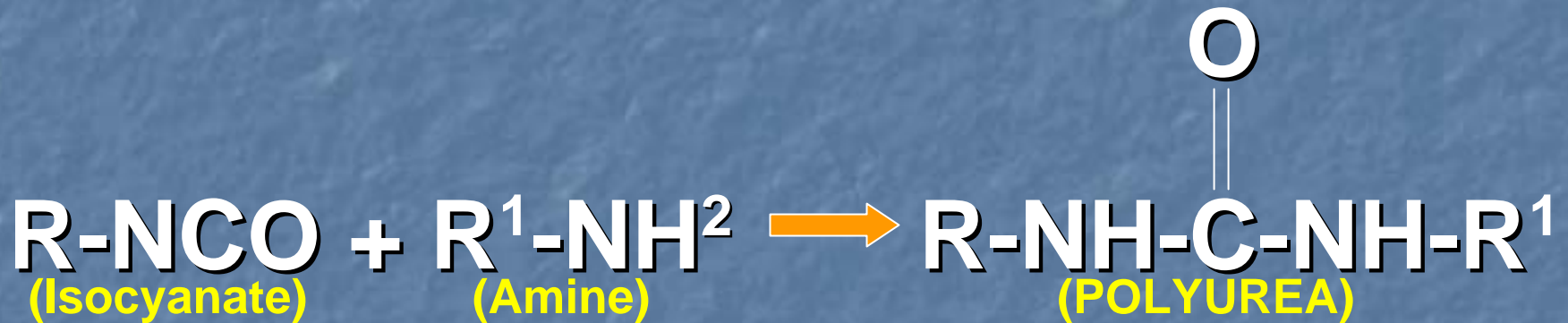
Isocyanate

**Amine**

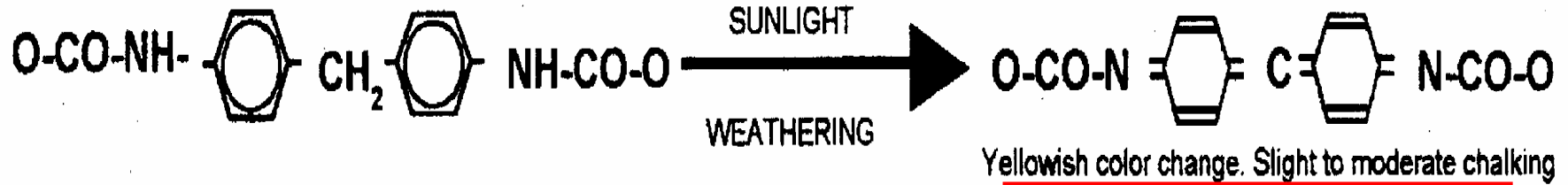
# Polyurethane Reaction



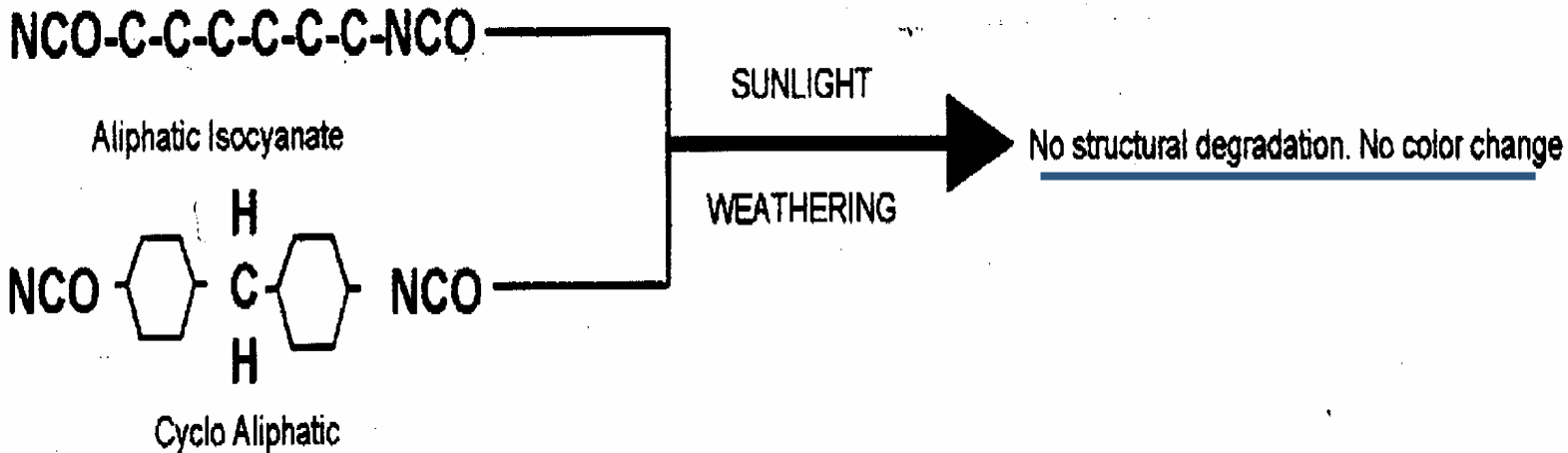
# *Polyurea Reaction*



## AROMATIC



## ALIPHATIC



# Isocyanate Types

# DEFINITION

## POLYURETHANE / POLYUREA

- Futura & Huntsman define:
  - Polyurea as having >80% amine content in the “B” component.
  - Polyurethane as having >80% polyol content in the “B” component.
  - Polyurethane / Polyurea Hybrid as a material between the above criteria.

# POLYURETHANE

- Developed during WW II.
- Solvent based became popular in the 1970's.
- Solvent free developed in the 1980's.
- Early uses were as coatings for Polyurethane foam roofing.



# POLYUREA

- Developed in the early 1980's.
- Texaco (Huntsman) has patent on raw materials.
- Worked closely with Futura to develop the first spray applied Polyurea.
- Futura produced the first commercial Polyureas in 1985.

# COMPARISON

## POLYURETHANE / POLYUREA

PROPERTY	POLYURETHANE	POLYUREA
VOC	0	0
TACK FREE (sec)	8 – 10	5 – 8

- A lot of hype that Polyureas are solventless and cure fast
- Polyurethanes also have these properties.

# COMPARISON

## POLYURETHANE / POLYUREA

PROPERTY	POLYURETHANE VS POLYUREA
Tensile Strength	=
Elongation	= / +
Flexibility	+
Tear Resistance	- / =
Abrasion Resistance	+
Chemical Resistance	+
Weatherability	+
Heat resistance	-
Heat Sink Resistance	-

**In most cases Polyurethanes are slightly better**

# COMPARISON

## POLYURETHANE / POLYUREA

*Many of our competitors  
are promoting their  
Polyureas as having  
the ability to be  
applied to  
"Wet Surfaces"*

# COMPARISON

## POLYURETHANE / POLYUREA

-What Happens-

- URETHANE:

- Urethane + H<sub>2</sub>O = CO<sub>2</sub> Gas / Foaming

- POLYUREA:

- Polyurea + H<sub>2</sub>O = High resistance to CO<sub>2</sub> Gas / Foaming

# COMPARISON

POLYURETHANE / POLYUREA

**REMEMBER !**

→ Even though Polyureas are tolerant to moisture - We do not recommend abusing surface preparation particularly on critical applications.

# FACT

→ With the driving force of lowering VOC's and the requirement for faster curing / high build systems there has been a rapid proliferation of Unsophisticated Polyurea companies, products and applicators.

# FACT

**Polyurea systems are more costly than Polyurethane systems.**



# FACT

*As a result, many of our competitors are not supplying a pure Polyurea but still call their product a Polyurea.*

# FACT

Futura determined years ago  
that developing blends of  
Polyurethanes and Polyureas  
will provide the best balance  
of Physical and Performance  
Properties.

# FACT

- Unlike our Competition
  - Futura does not “Over-hype” the use of Polyurea
  - Futura does not believe that “one” system can do multiple applications without some trade-off

# QUESTIONS

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rrw Futura Coatings