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# Catalysis of the Epoxy- Carboxyl Reaction

W.J. Blank, Alex A. He, Marie Picci

King Industries

Norwalk, CT 06852



[wblank@kingindustries.com](mailto:wblank@kingindustries.com)

[werner@wernerblank.com](mailto:werner@wernerblank.com)

# OBJECTIVES OF THIS WORK

CATALYST FOR EPOXY-CARBOXYL

CATALYST FOR GLYCIDYL ETHER

GLYCIDYL ESTER

STABLE AT ROOM TEMPERATURE

NON-YELLOWING

RESISTANCE PROPERTIES

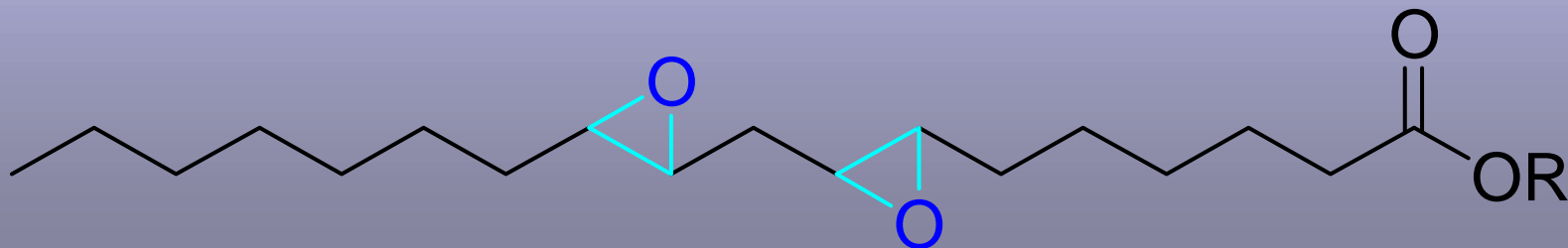
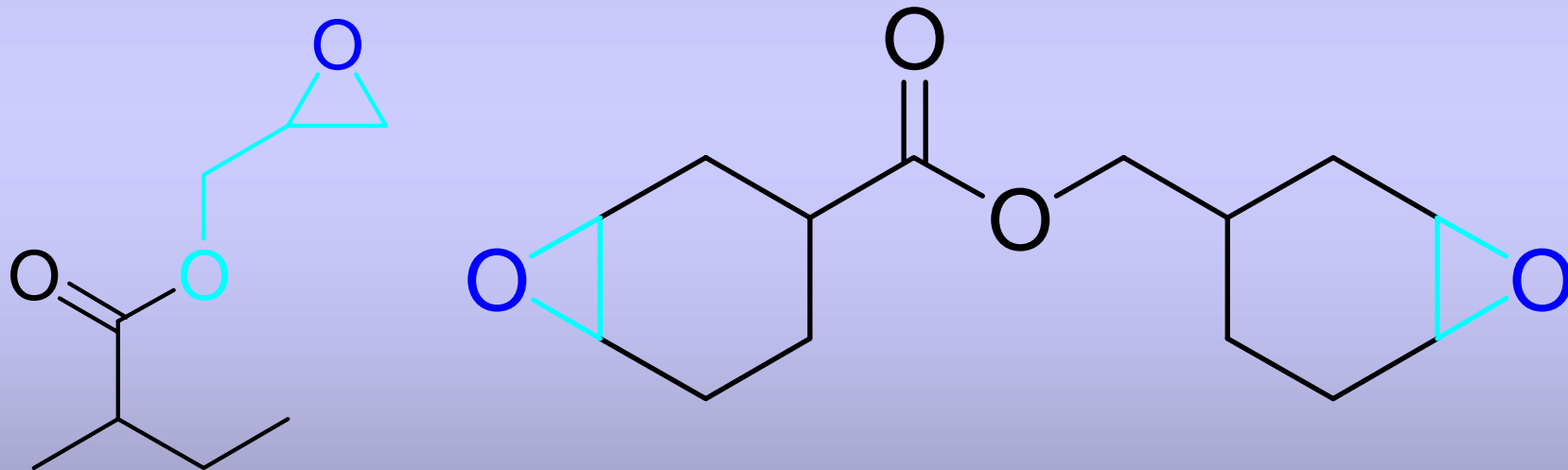
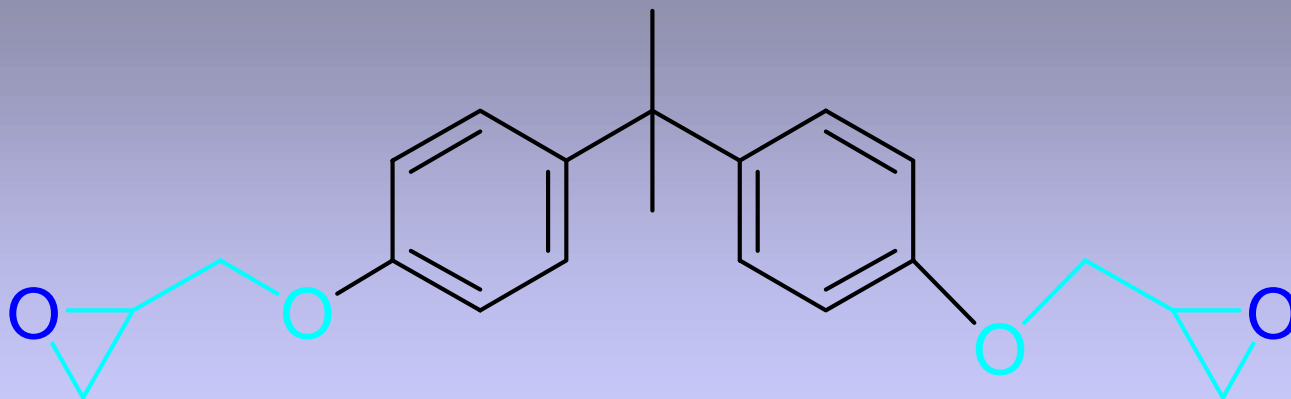
ADHESION

CORROSION

EXTERIOR DURABILITY

WATER RESISTANCE

# EPOXY RESINS

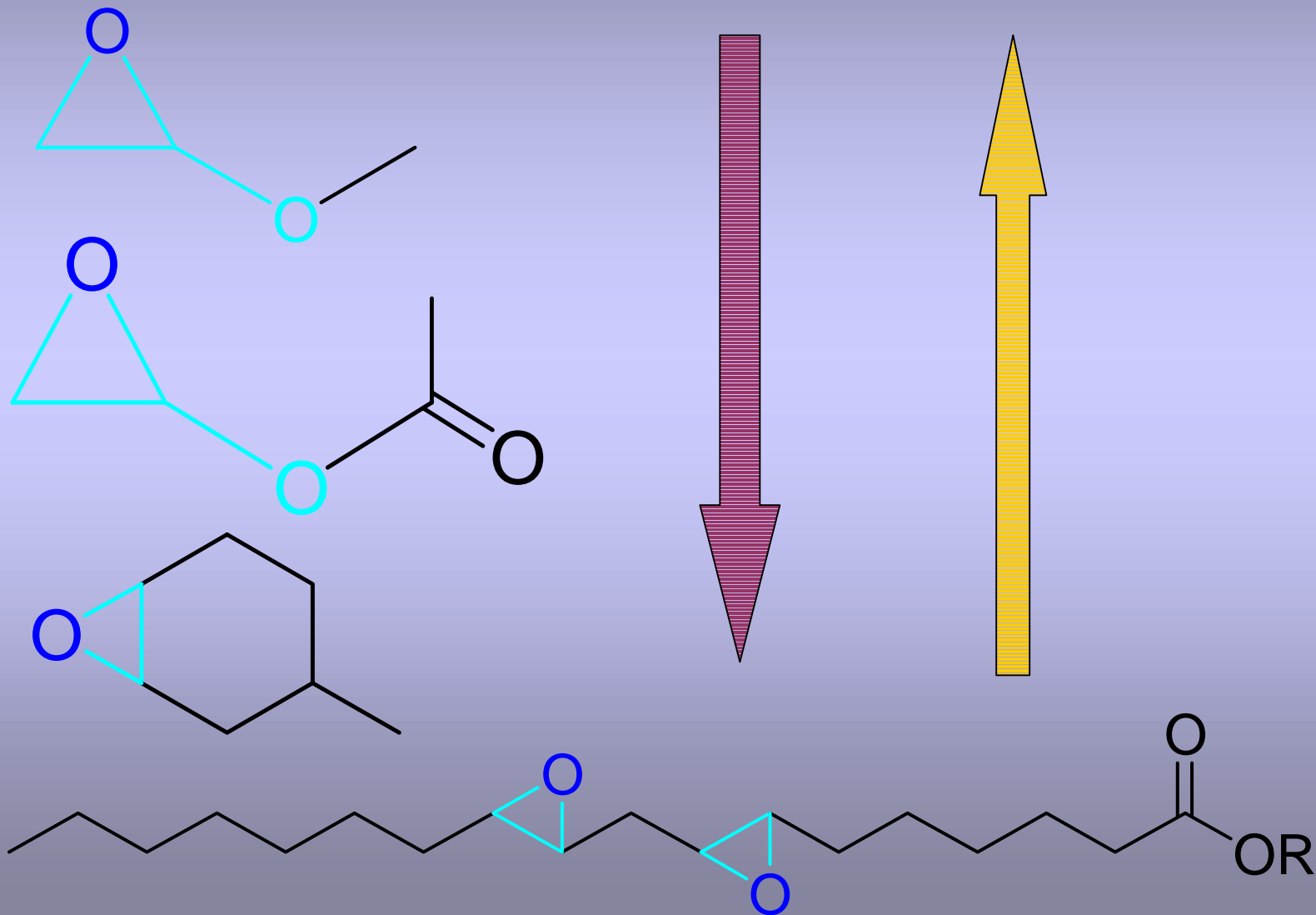


# CATALYSTS USED EPOXY SYSTEMS

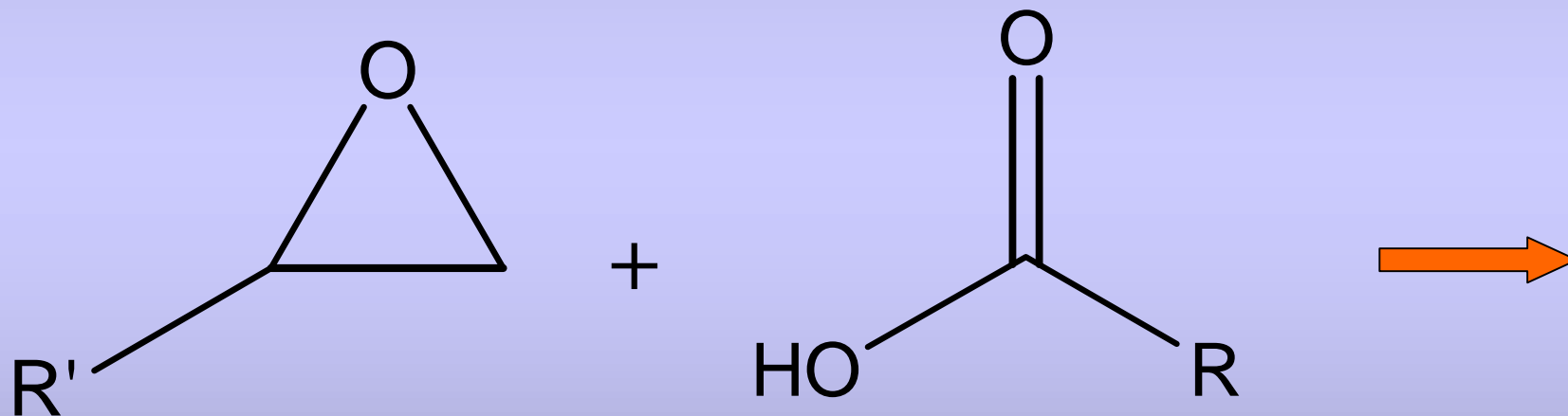
Acid

Base

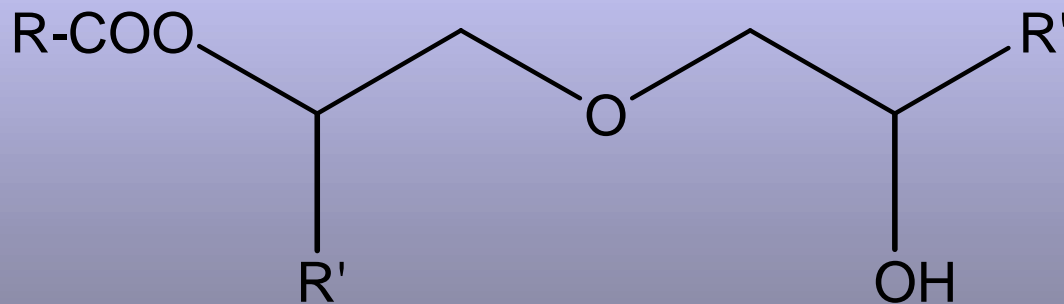
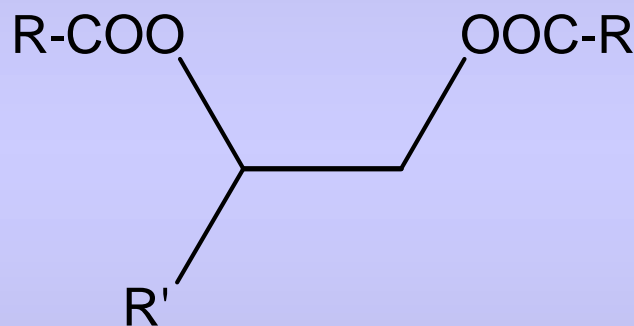
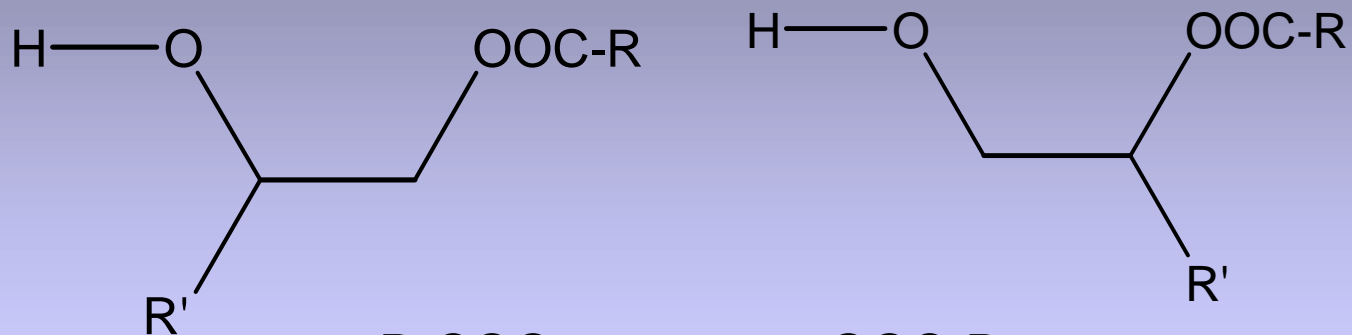
Metal



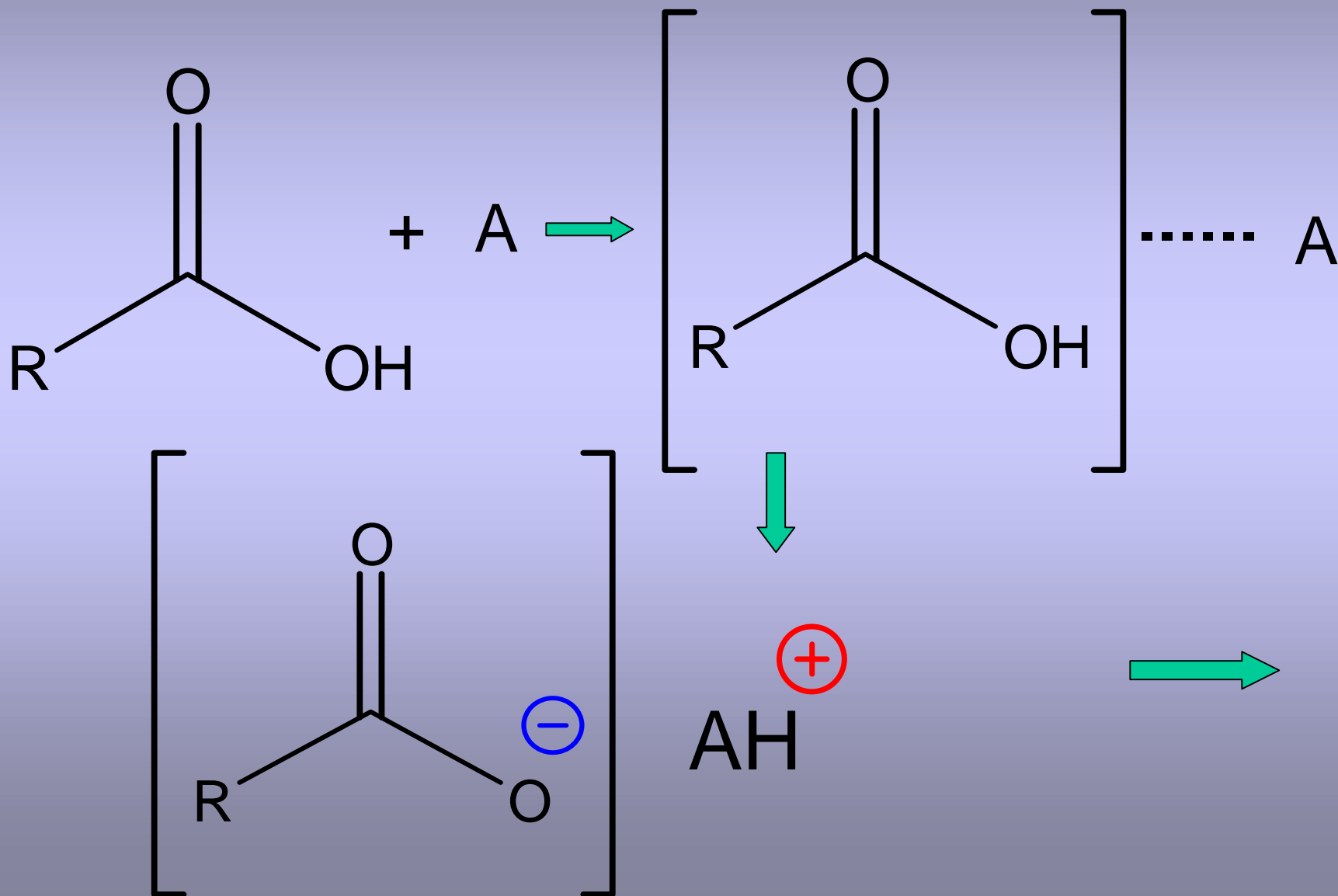
# REACTION OF EPOXY WITH CARBOXYL UNCATALYZED



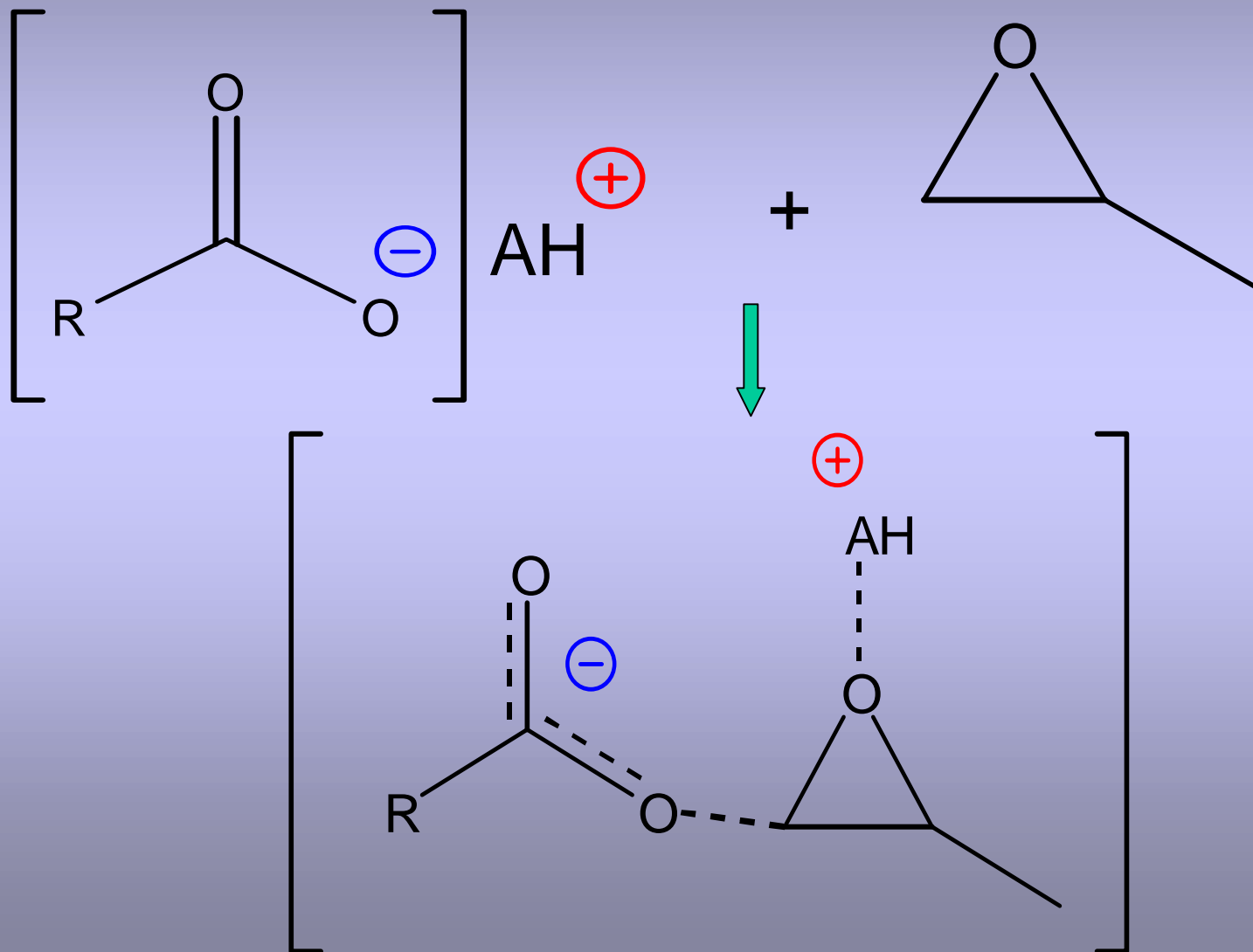
# REACTION PRODUCTS EPOXY-CARBOXYL



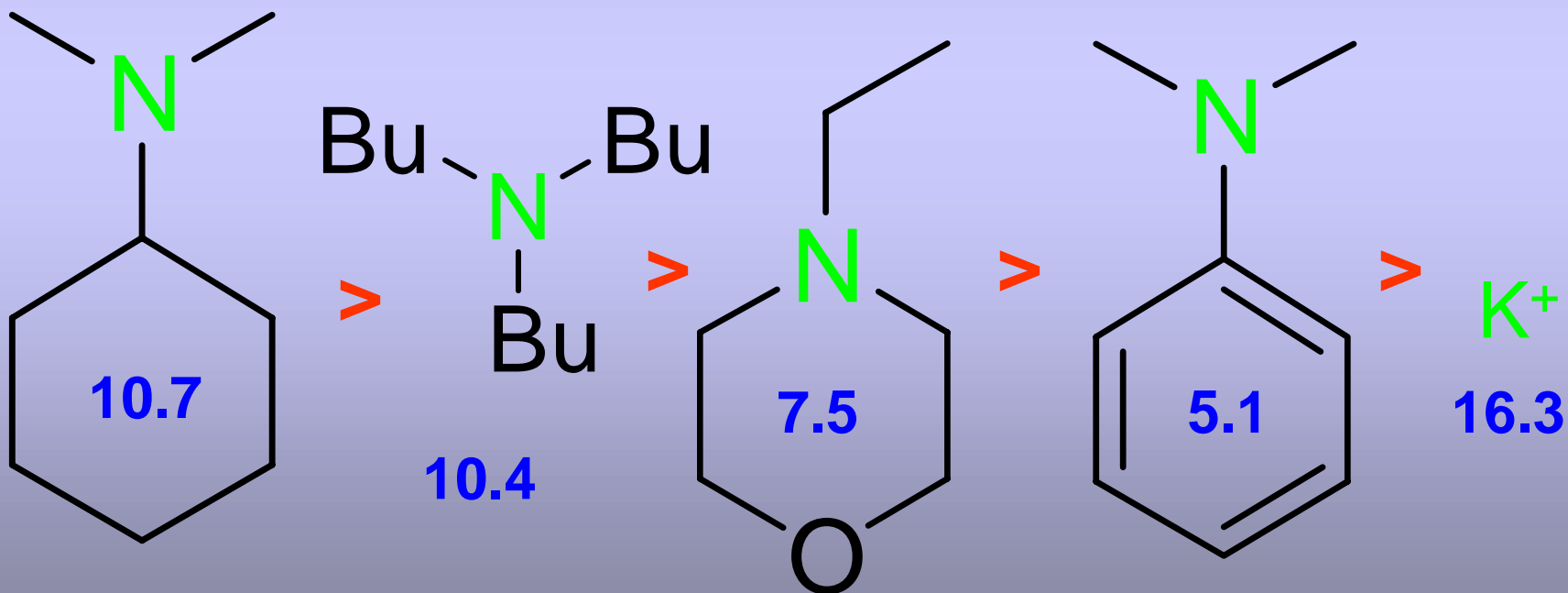
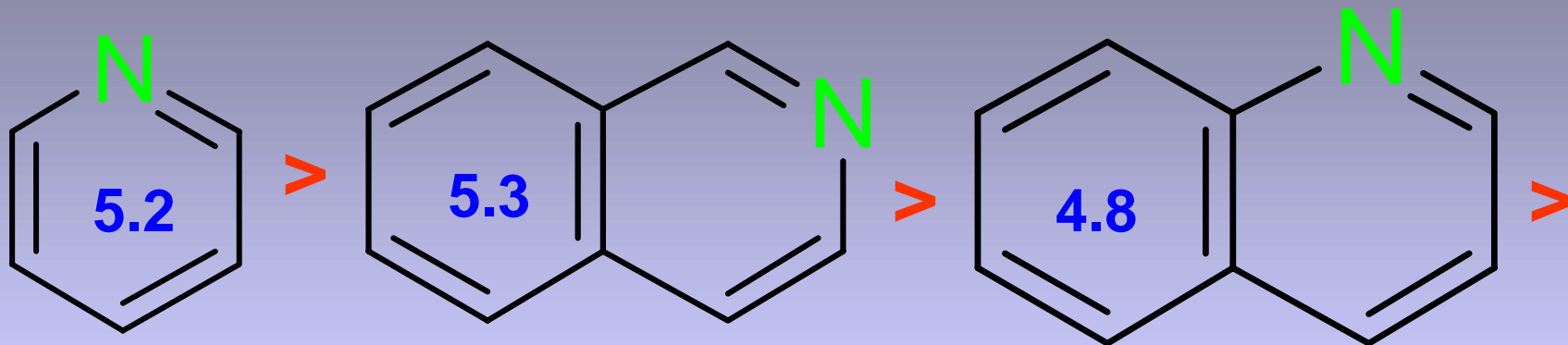
# REACTION OF EPOXY WITH CARBOXYL t-AMINE CATALYSIS



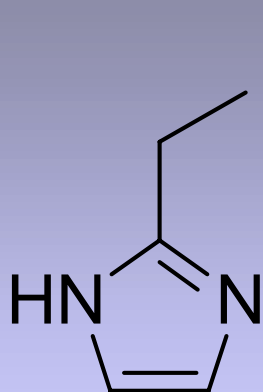
# REACTION OF EPOXY WITH CARBOXYL t-AMINE CATALYSIS



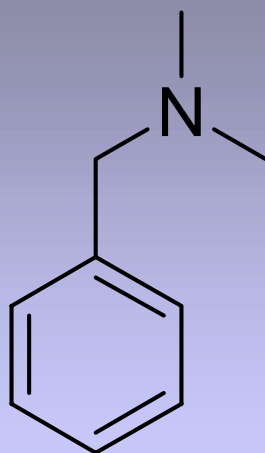
# CATALYSTS USED EPOXY SYSTEMS



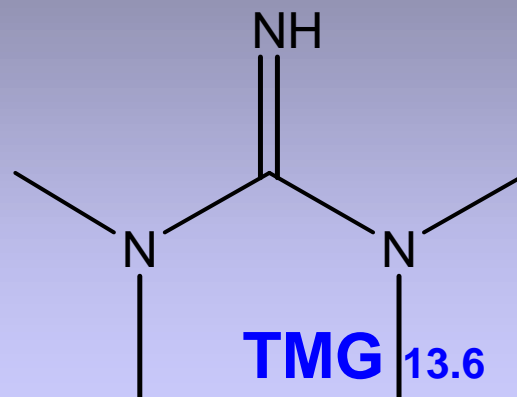
# AMINE CATALYST USED IN THIS STUDY



**2E-IMID** 7.0



**DMBA** 8.8



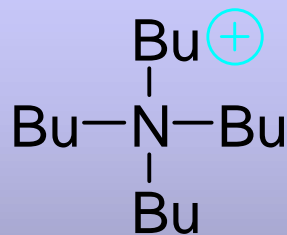
**TMG** 13.6



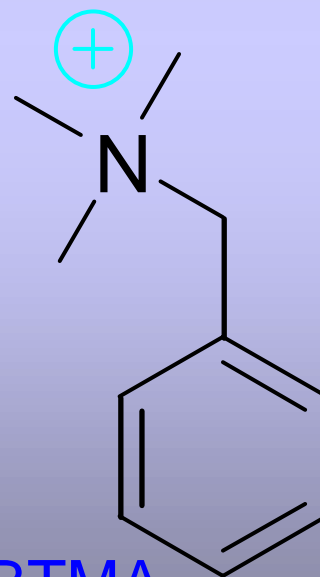
**DBN** 13.1



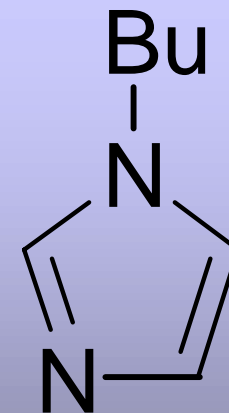
**DBU** 12.8



**TBA**



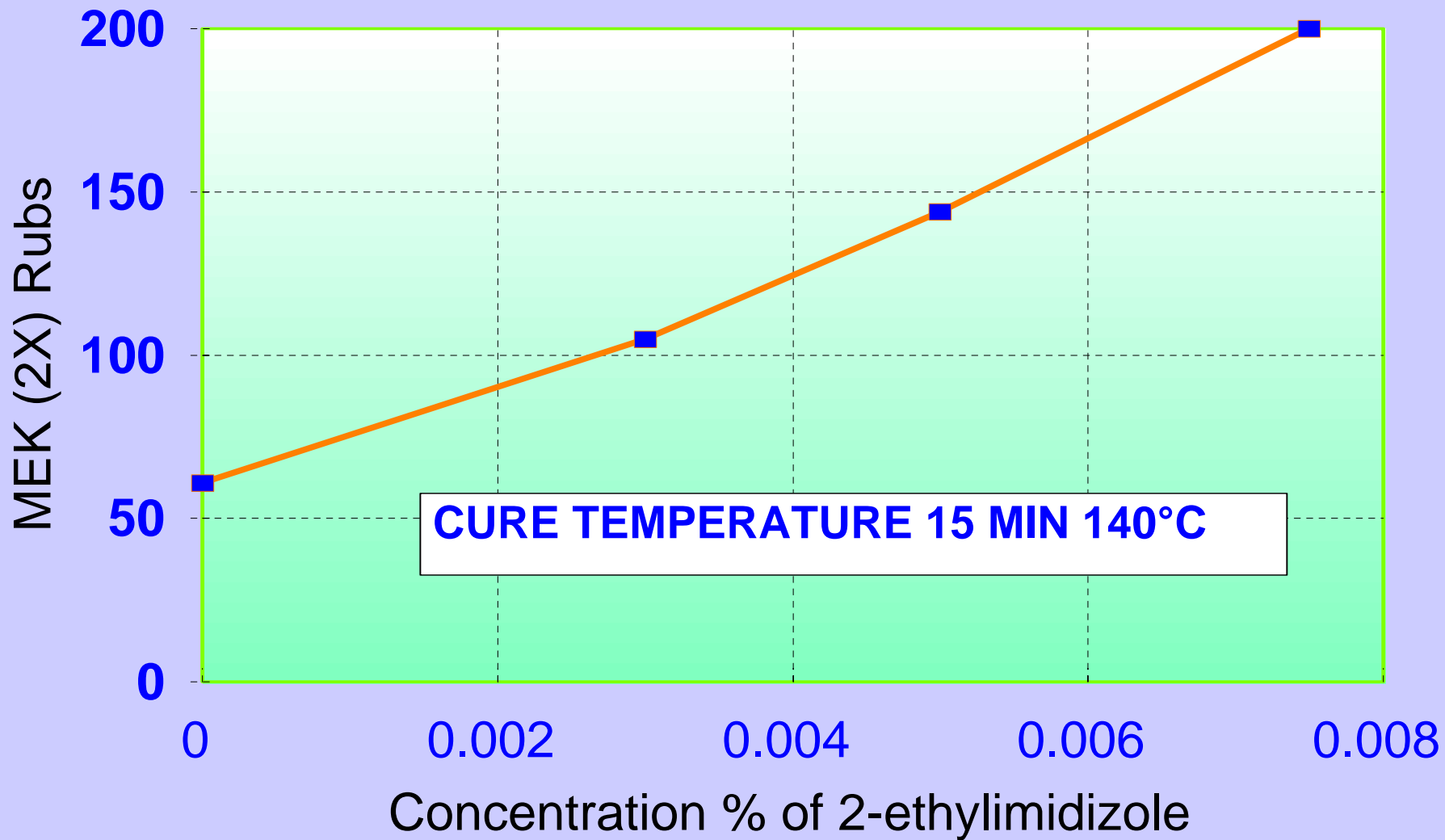
**BTMA**



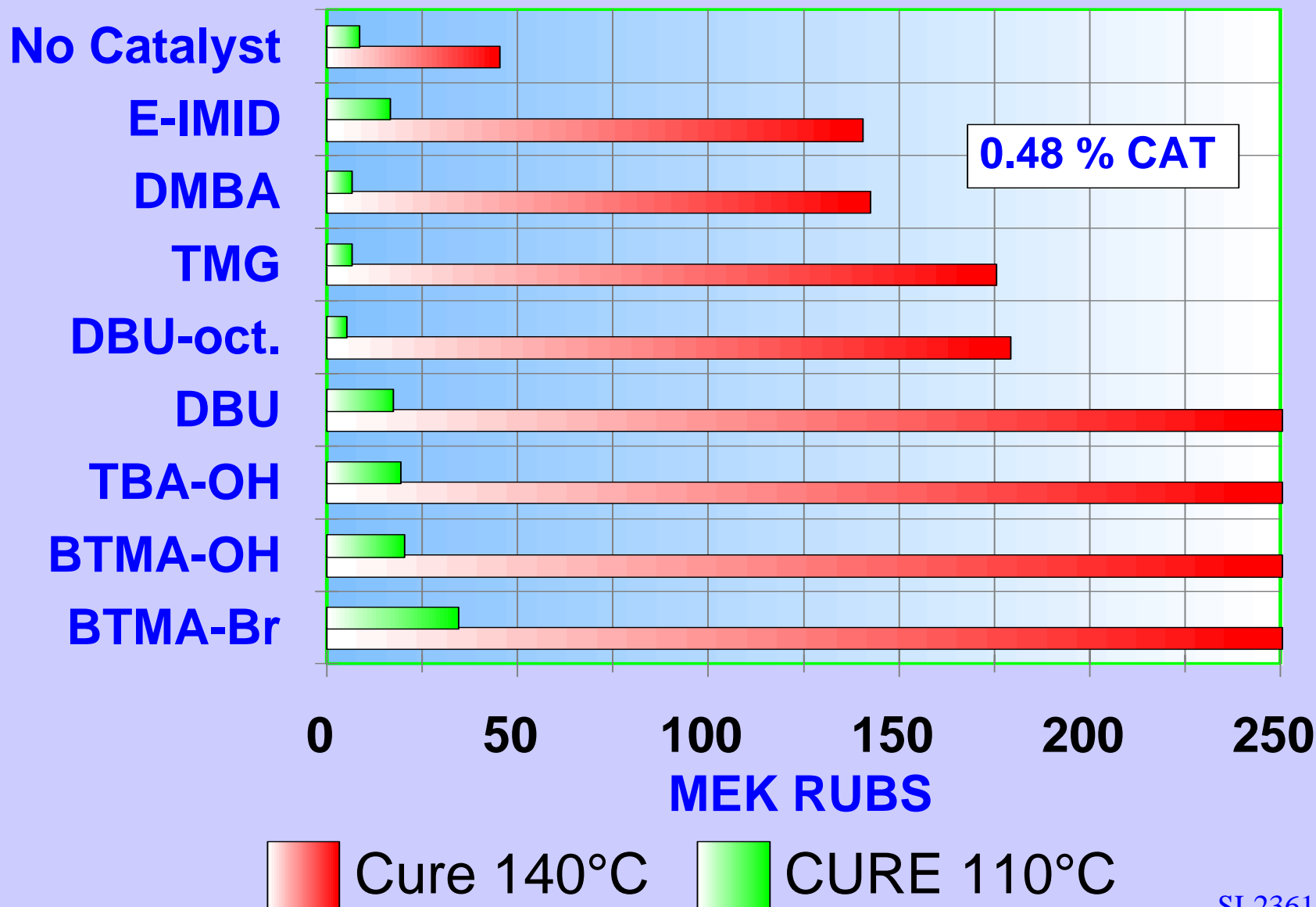
**1B-IMID** 7.1

# GLYCIDYL ESTER ACRYLIC/COOH

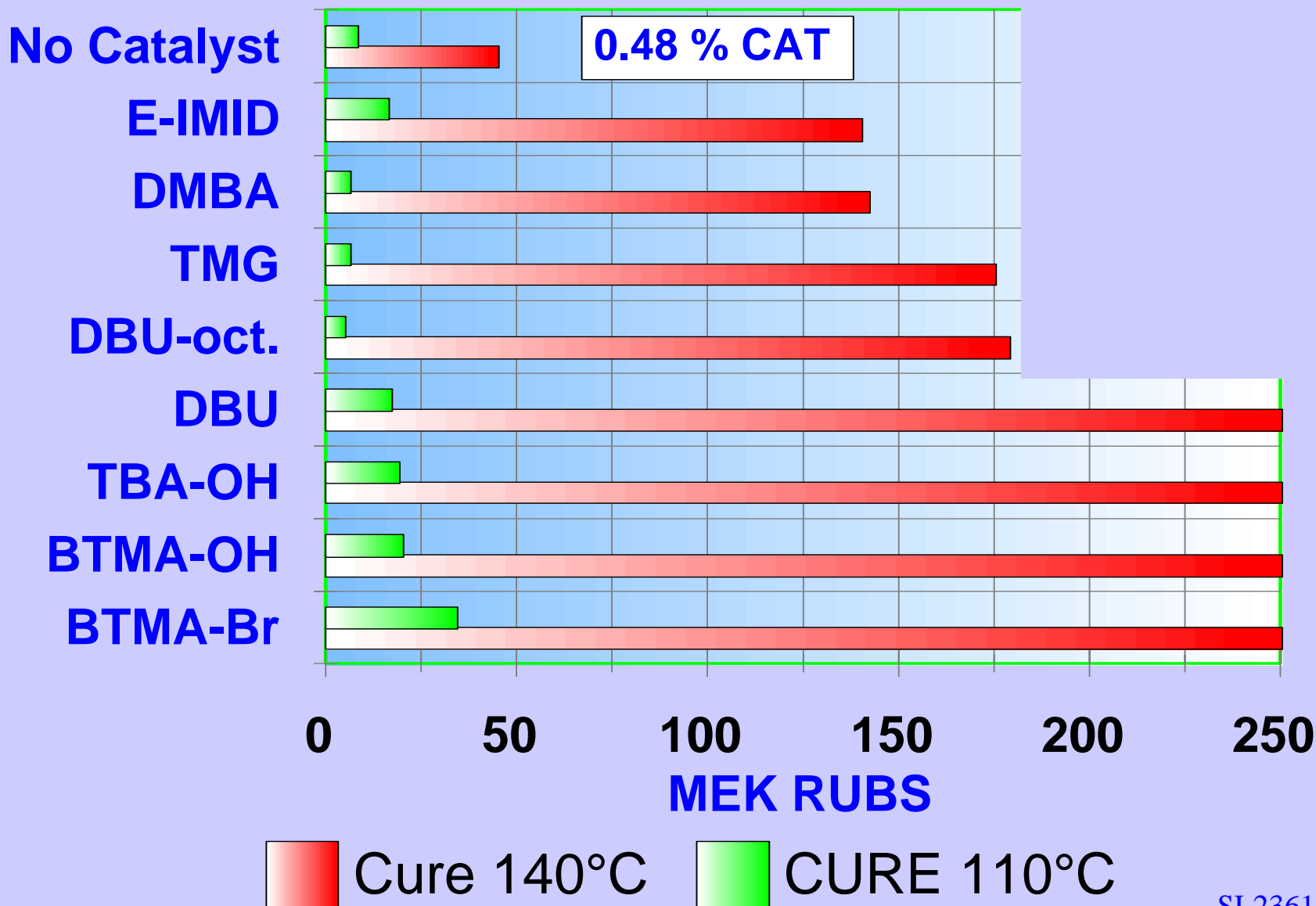
## 2-ETHYLIMIDAZOLE



# GLYCIDYL ACRYLIC/COOH

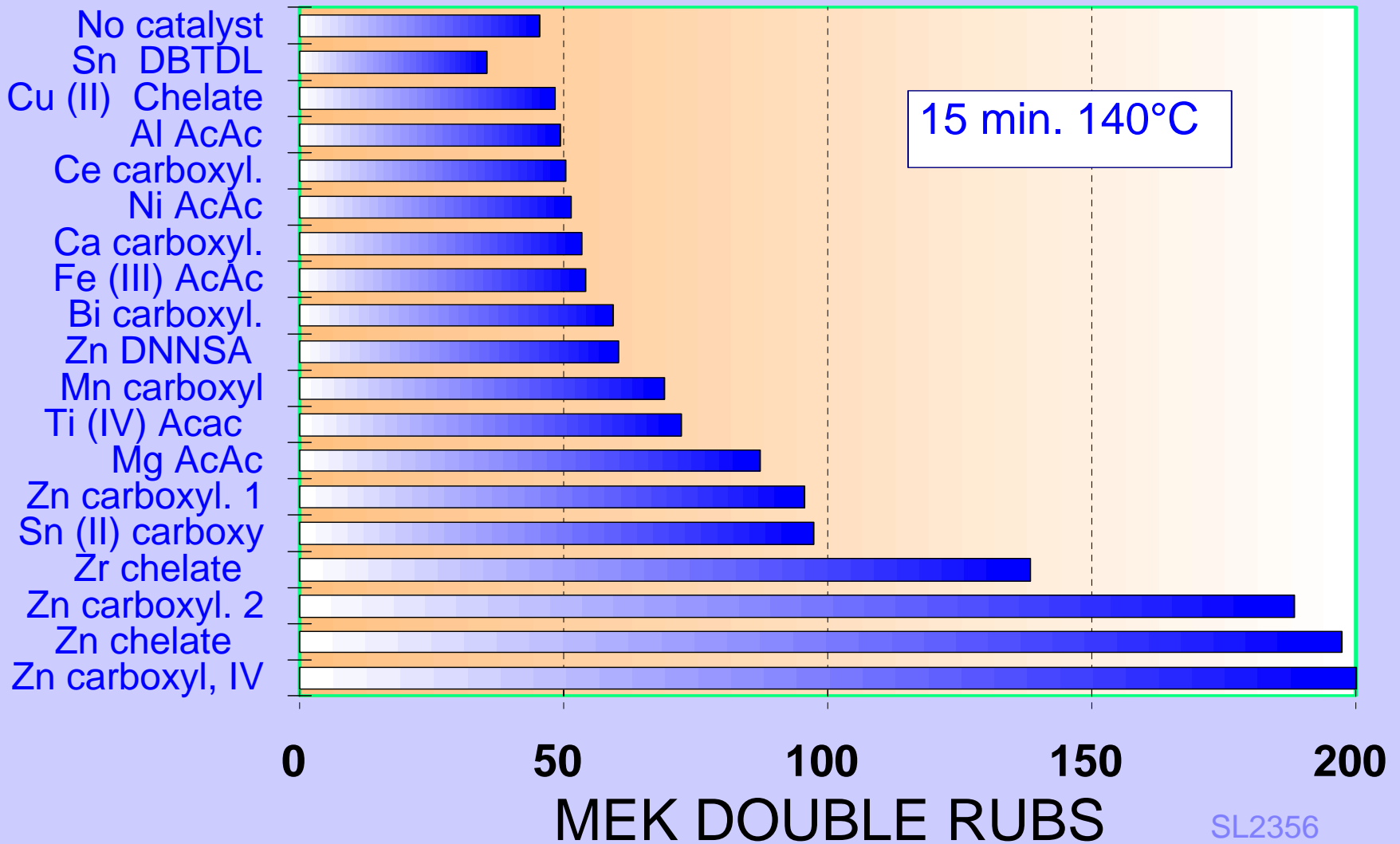


# GLYCIDYL ACRYLIC/COOH

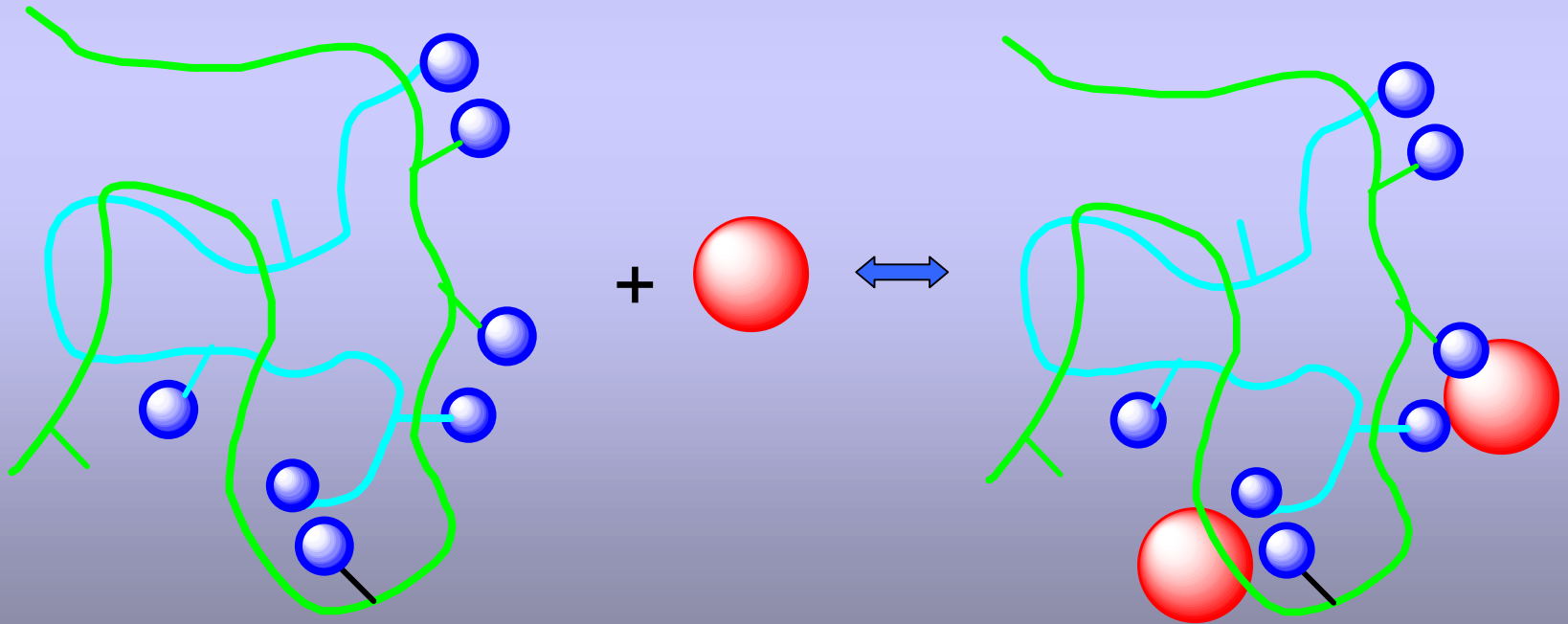
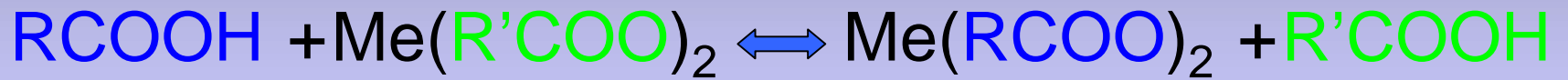


# GLYCIDYL ACRYLIC/COOH

## METAL CATALYST, 0.28 % Me

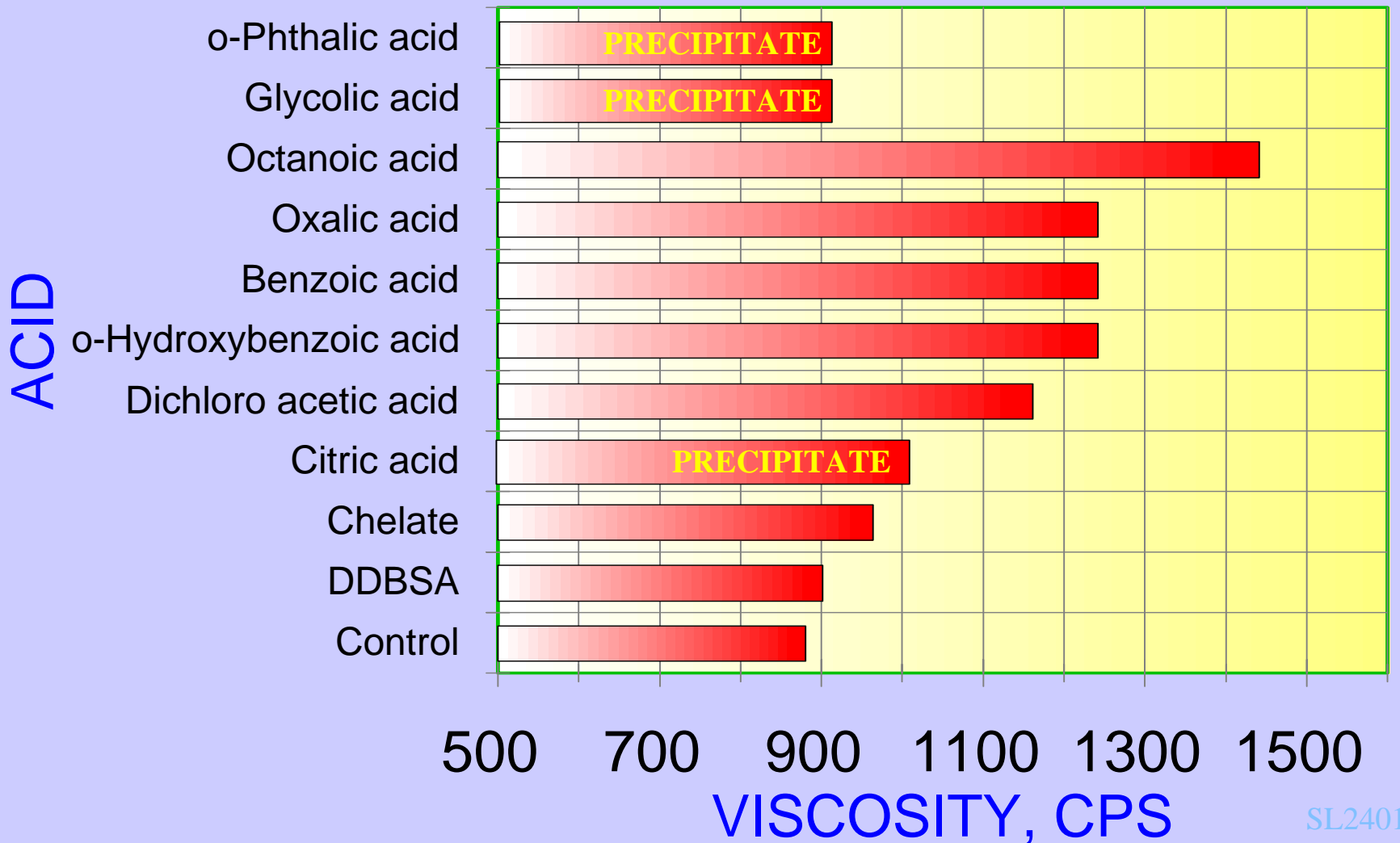


# METAL CATALYSTS



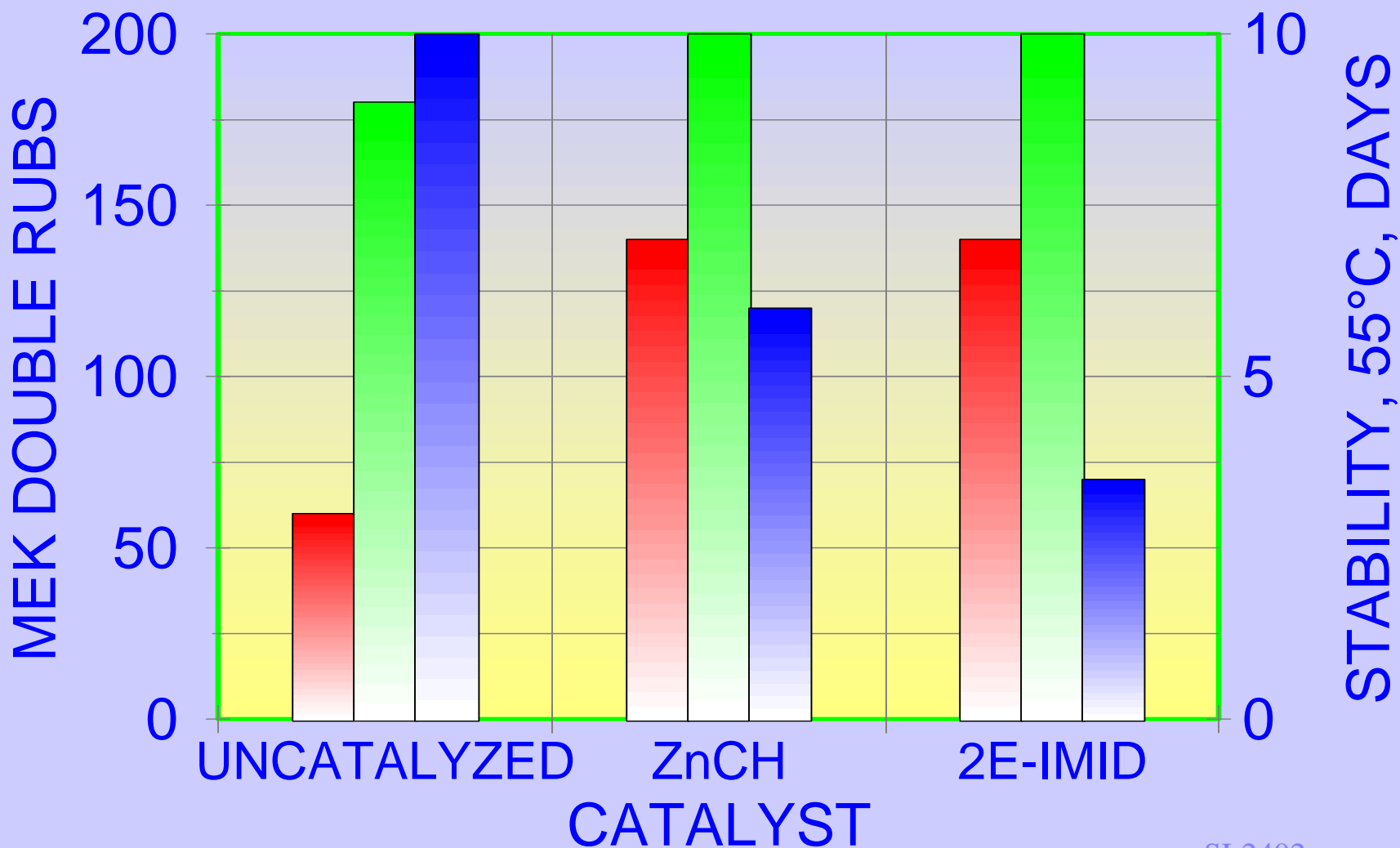
# ACRYLIC COOH FUNCTIONAL

ZINC SALTS 0.4 % Zn



# GLYCIDYL ESTER ACRYLIC/COOH

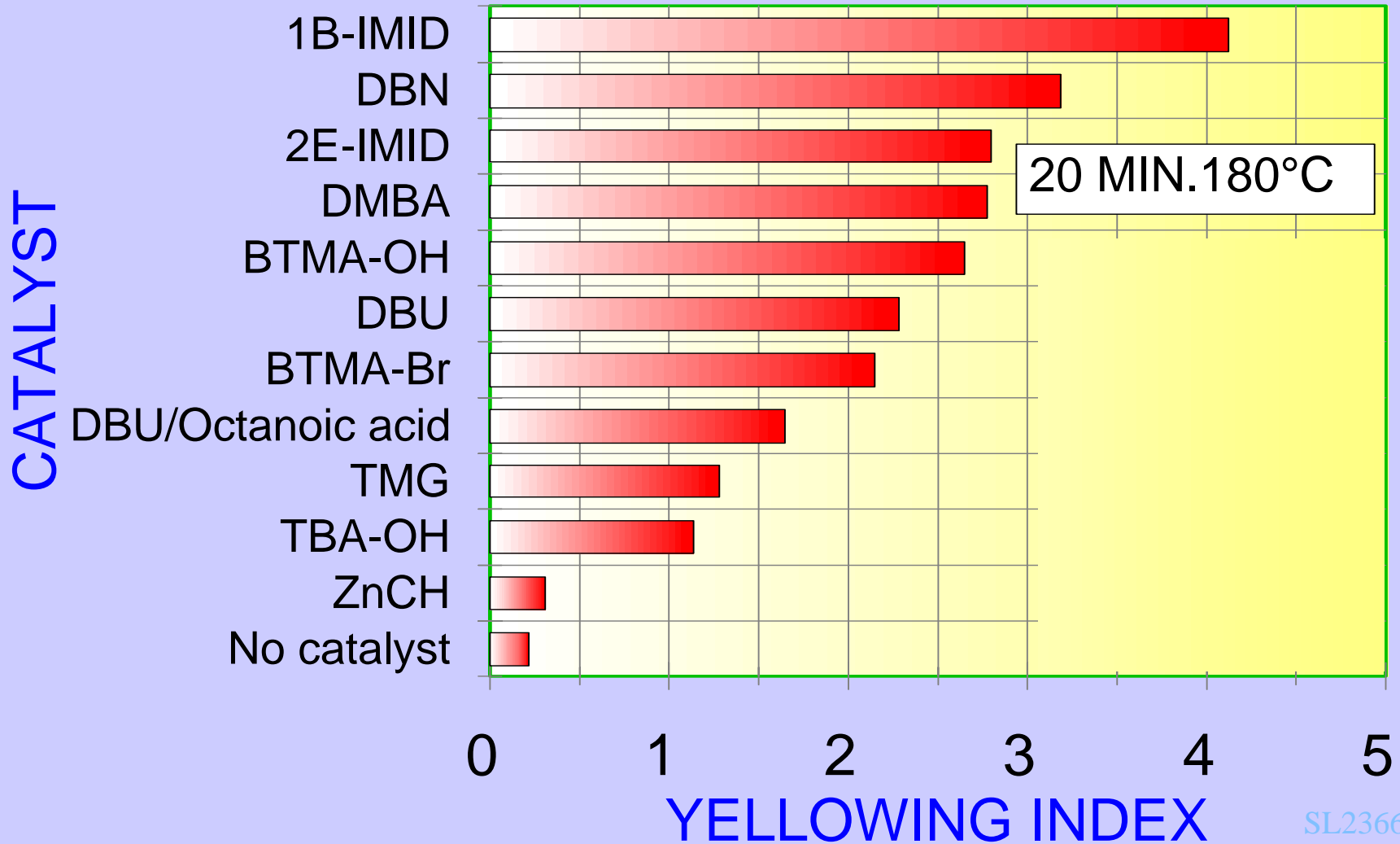
ZnCH (0.24 %), 2ETH IMIDAZOLE(0.48 %)



SL2402

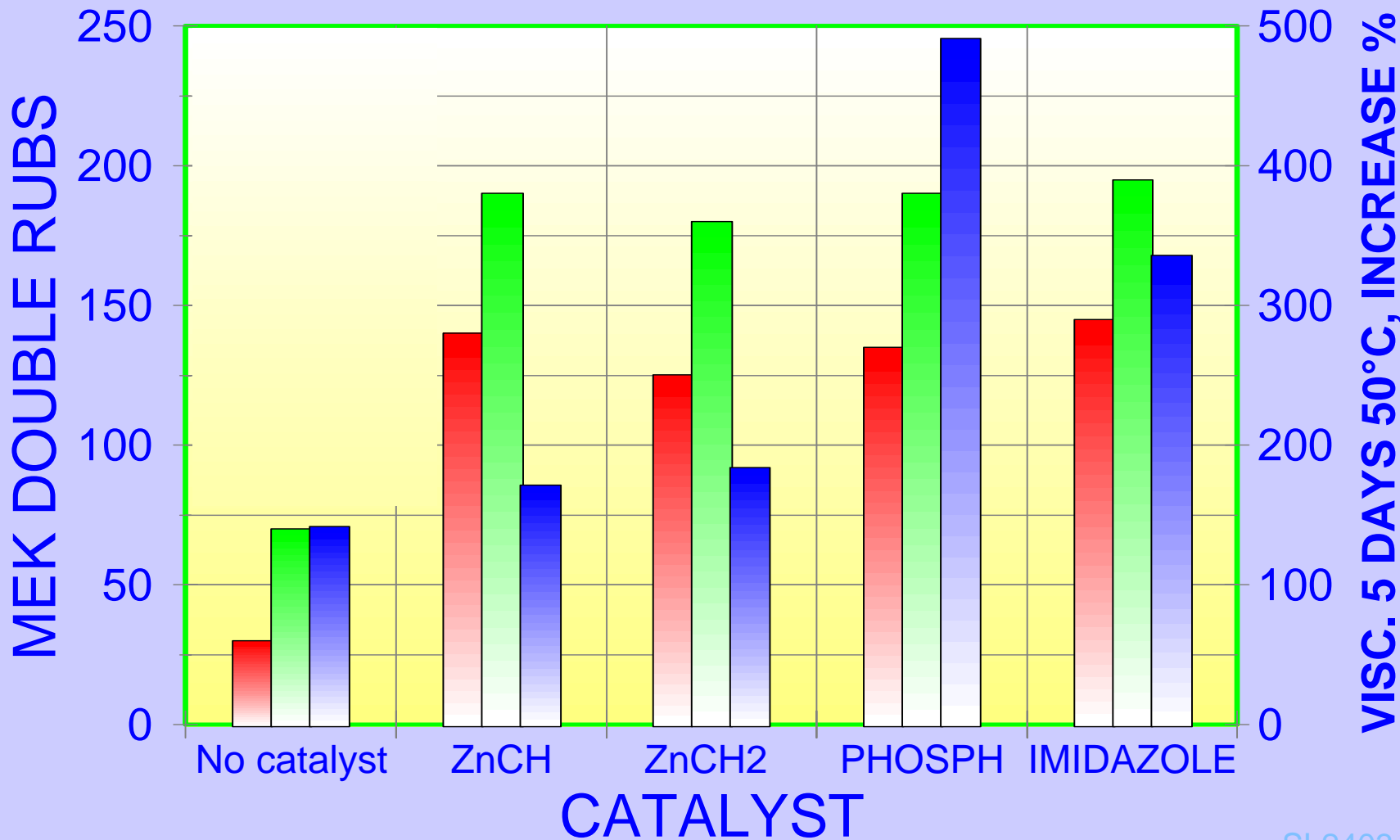
MEK 140°C    MEK 150°C    STABILITY

# YELLOWING EPOXY/CARBOXYL GLYCIDYL ESTER -COOH ACRYLIC



# PE COOH/BIS A DIGLYCIDYL

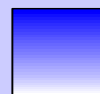
ZnCH 0.25 %, Amine 0.005 %



150°C



220°C



VISCOSITY

SL2403

# BIS A EPOXY / ACRYLIC COOH

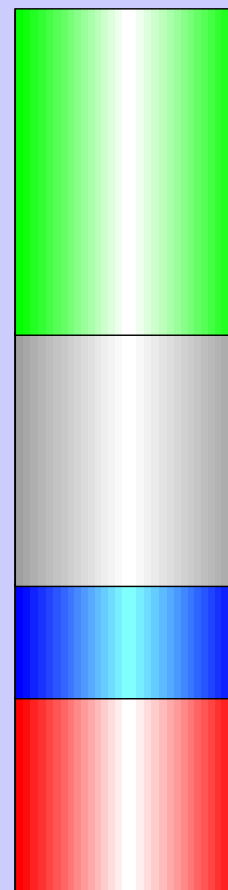
Equiv. Weight Epoxy 525, Acrylic 1150

Solvent (36.7)

Titanium dioxide (28.4)

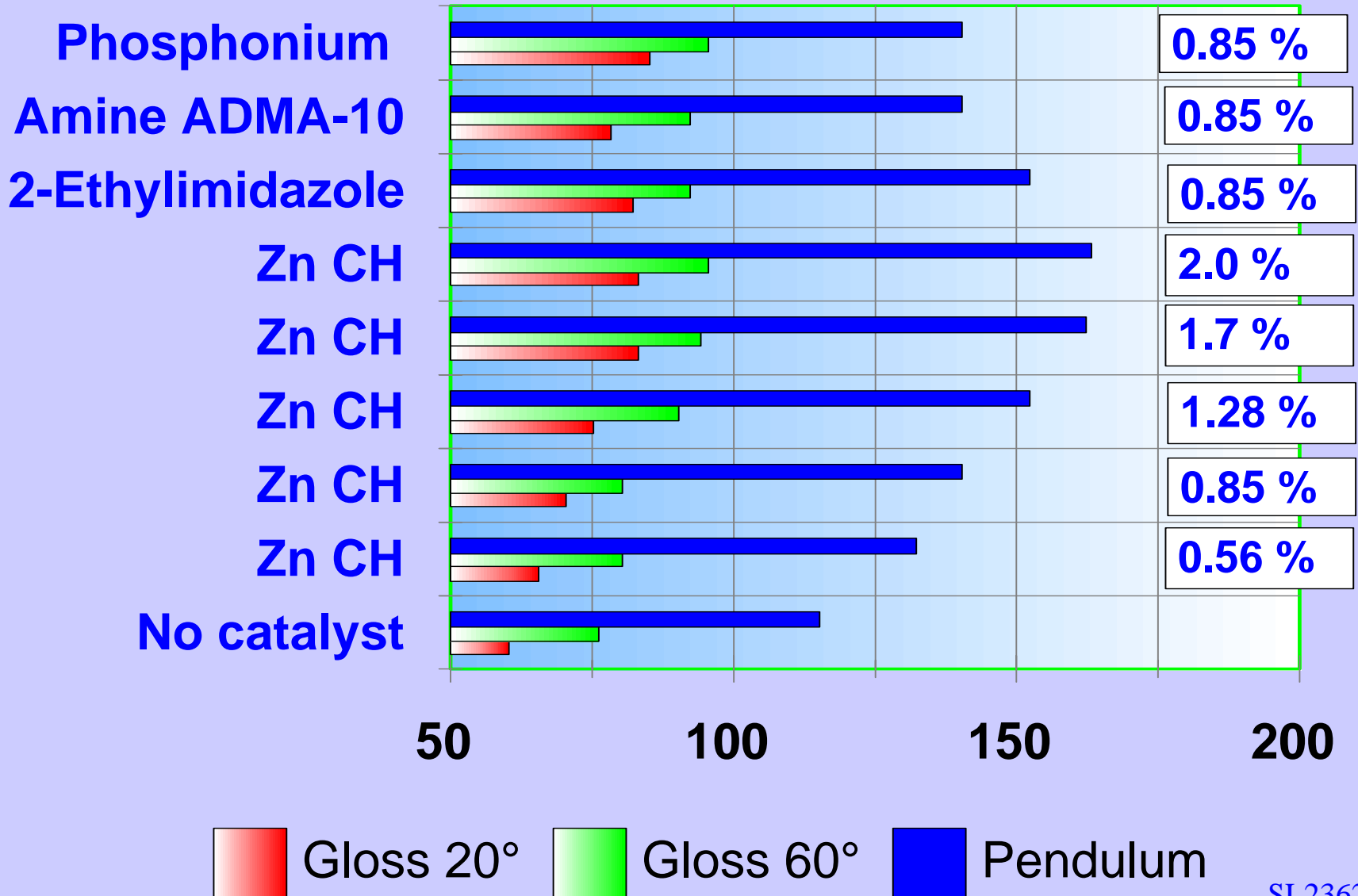
Epoxy (12.8)

Acrylic (21.9)



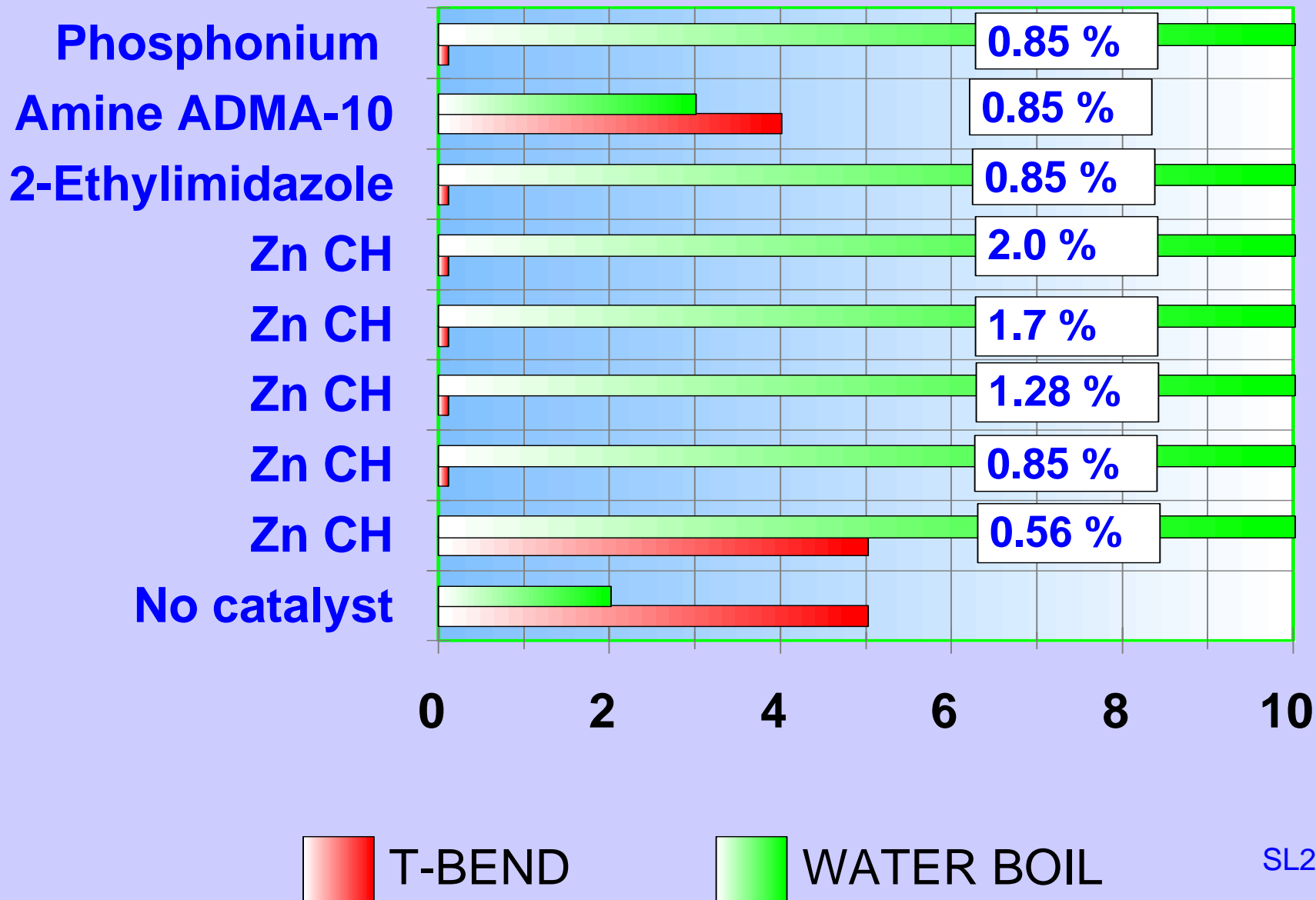
# BIS A EPOXY / ACRYLIC COOH

TiO2 pig. 5 micron, 6' 204°C



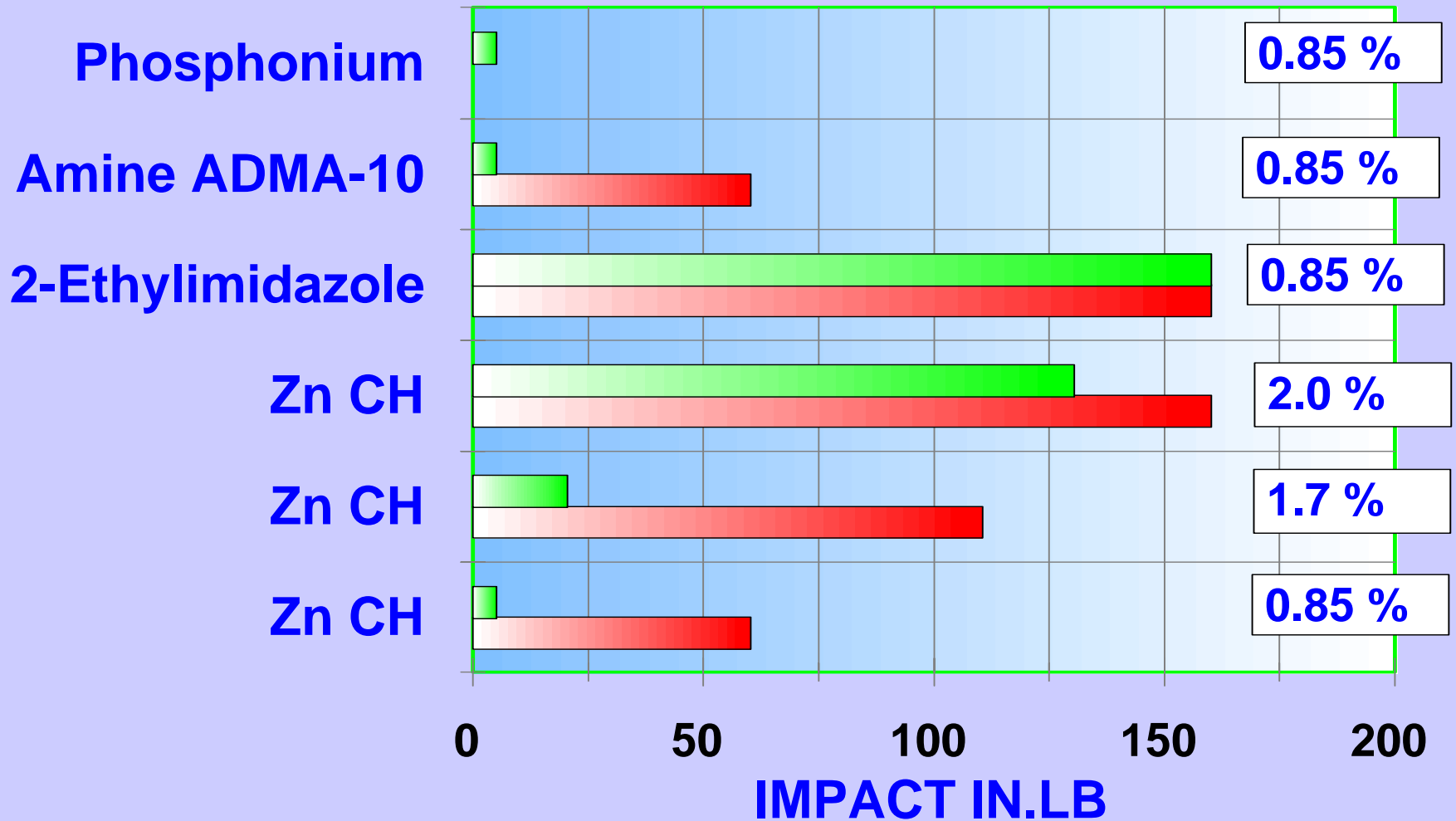
# BIS A EPOXY / ACRYLIC COOH

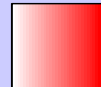

TiO2 pig., 5 micron 6' 204°C



# BIS A EPOXY / ACRYLIC COOH

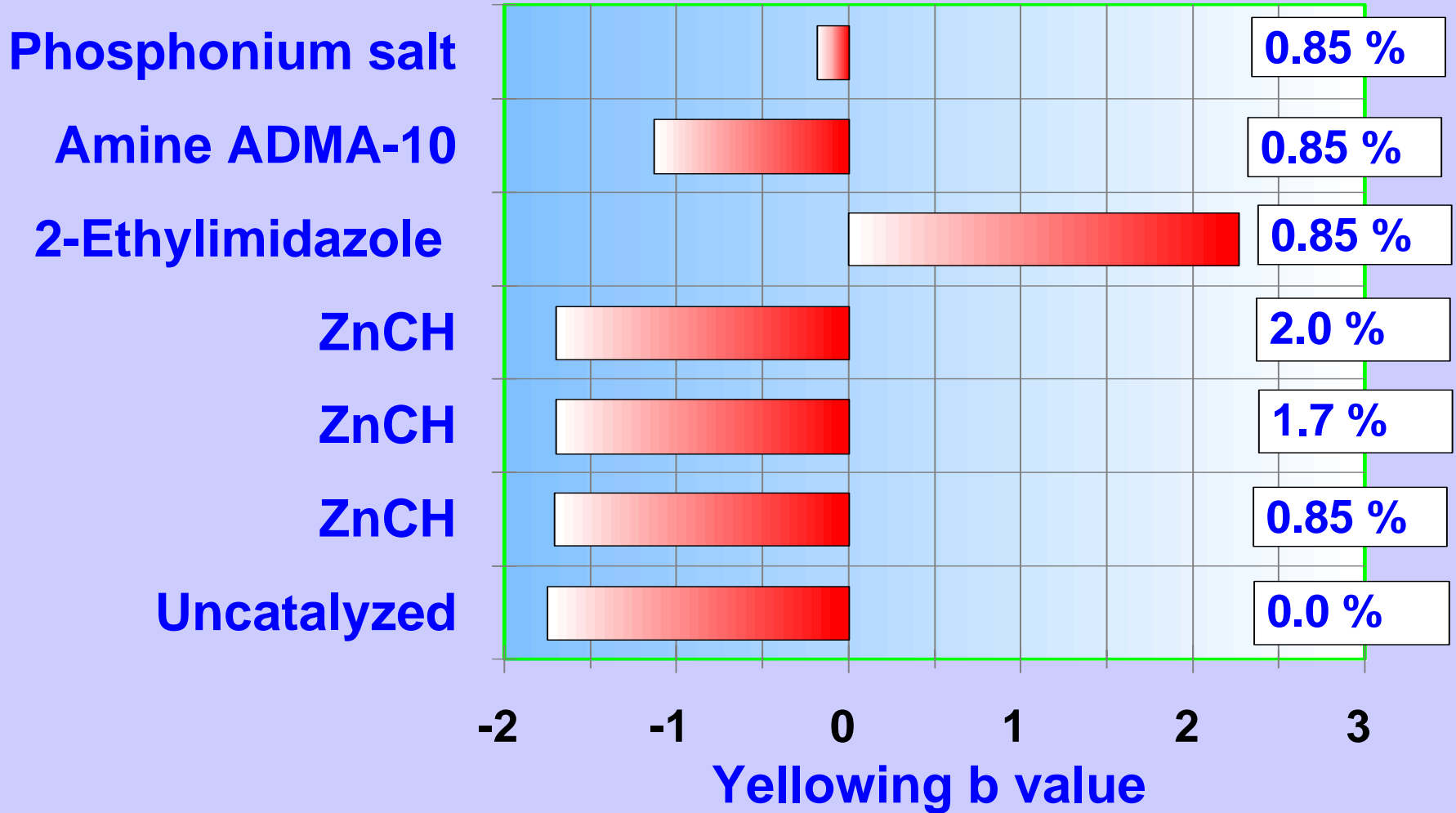
TiO2 pig. CURE 6 min. 200°C, 25 micron



 Direct       Reverse

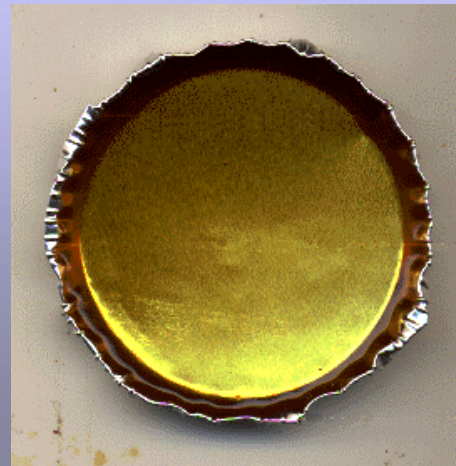
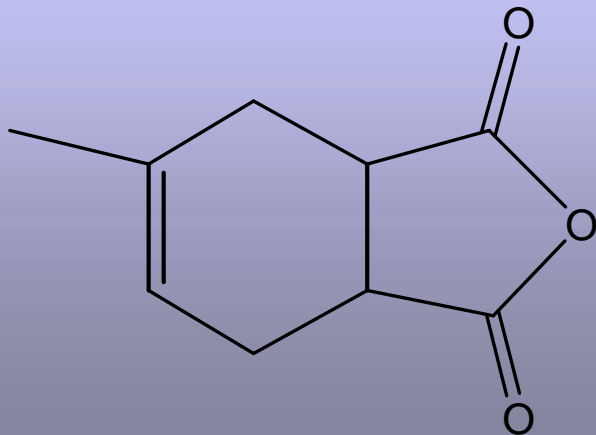
# BIS A EPOXY / ACRYLIC COOH

TiO<sub>2</sub> pig. CURE 6 min. 200°C, 25 micron



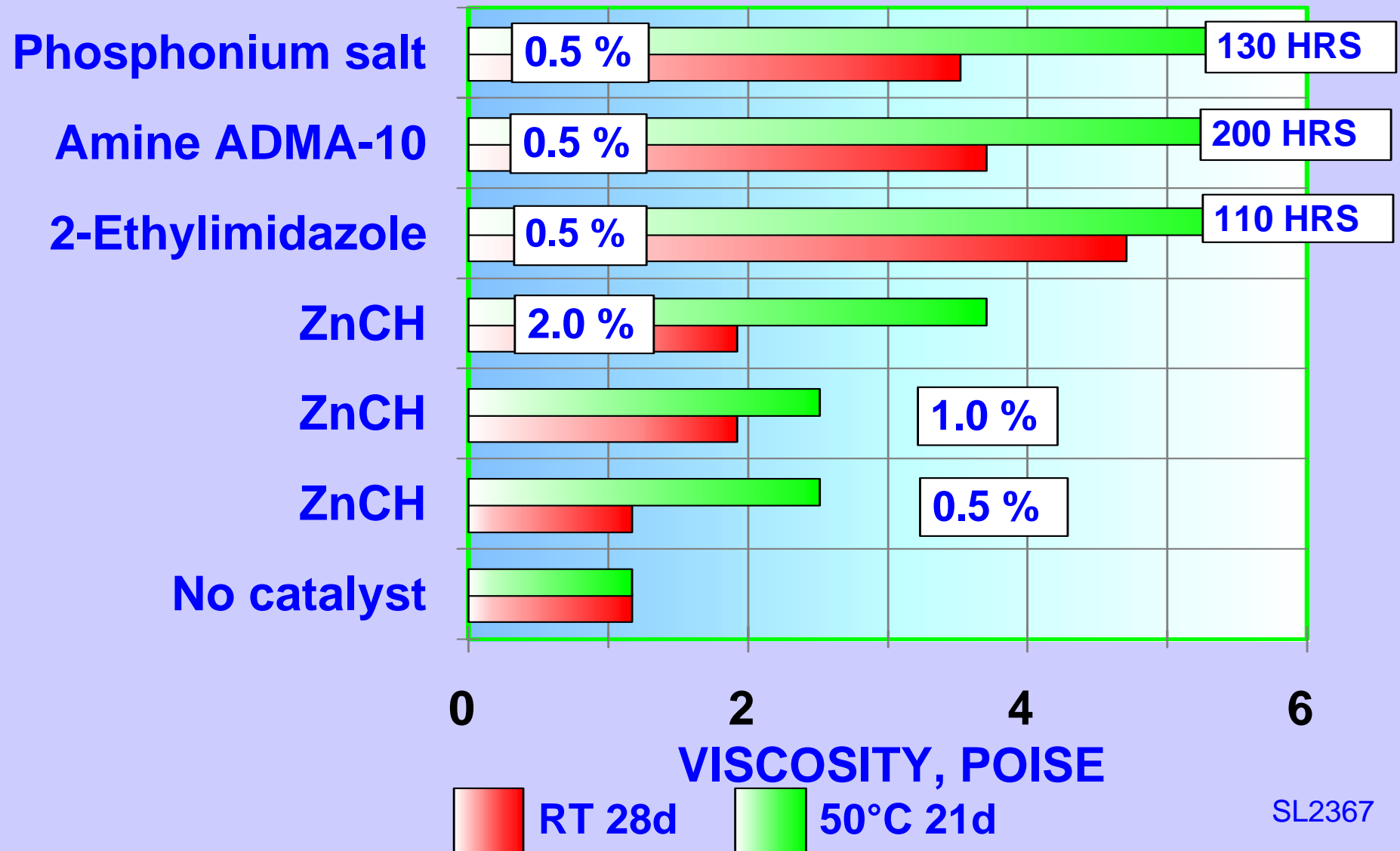
# BIS A EPOXY LIQUID/ MTHPA

	NO CAT.	2E-IMID	ZnCH
VISC. 25°C, CPS	900	900	900
VISC. 24hrs	900	4200	900
POTLIFE, DAYS	>14	3	>14
CURE 1hr. 80°C 3 hr.. 150 °C			
HARDN. SHORE D	LIQUID	95	95

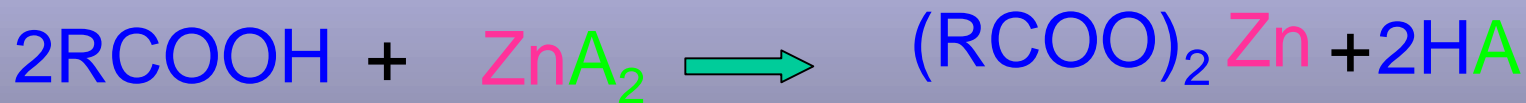
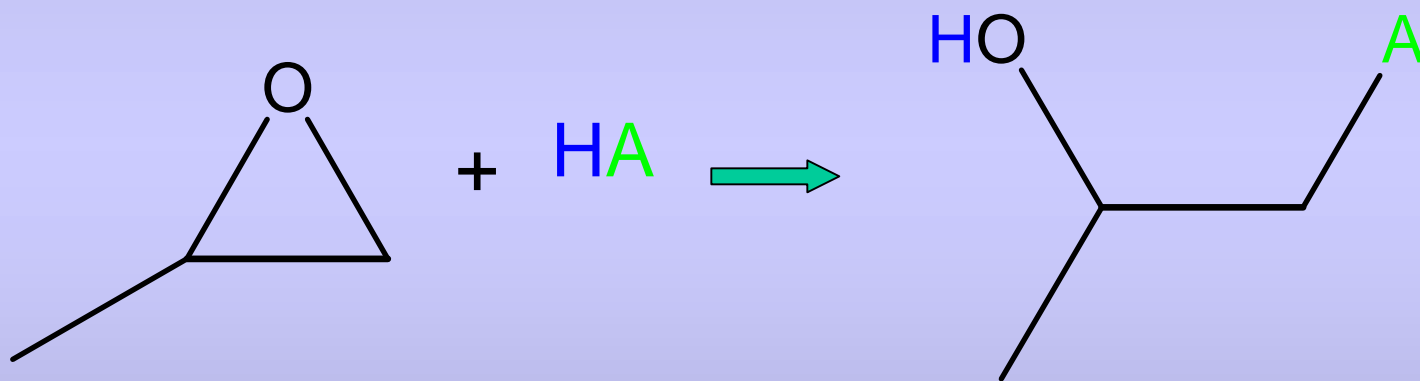
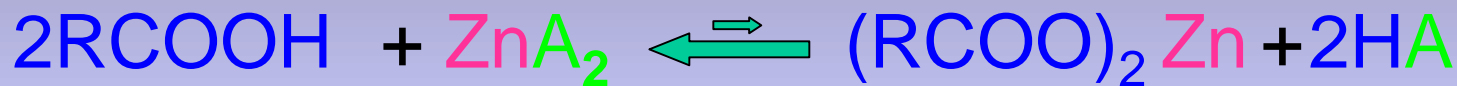


# BIS A EPOXY / ACRYLIC COOH

## VISCOSITY STABILITY



# METAL CATALYST ZnCH



# SUMMARY

## Zinc Chelate

Effective catalyst for

Glycidyl ester and glycidyl ether -

carboxyl/anhydride reaction

Improved resistance properties

Better adhesion

Longer potlife in comparison to basic catalysts

Reduced yellowing

# ACKNOWLEDGEMENT

KING INDUSTRIES

Dr. L. J. Calbo

Dr. C. G. Seefried

TECHNICAL SERVICE DEPARTMENT

Ms. Megan Ewing



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