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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

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

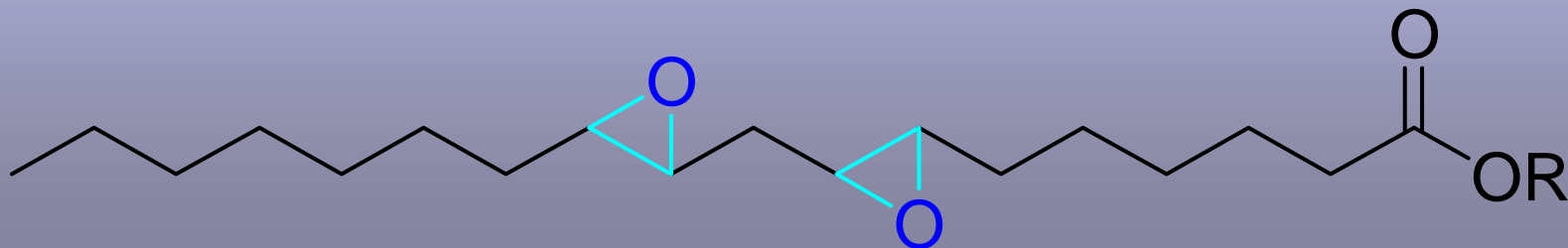
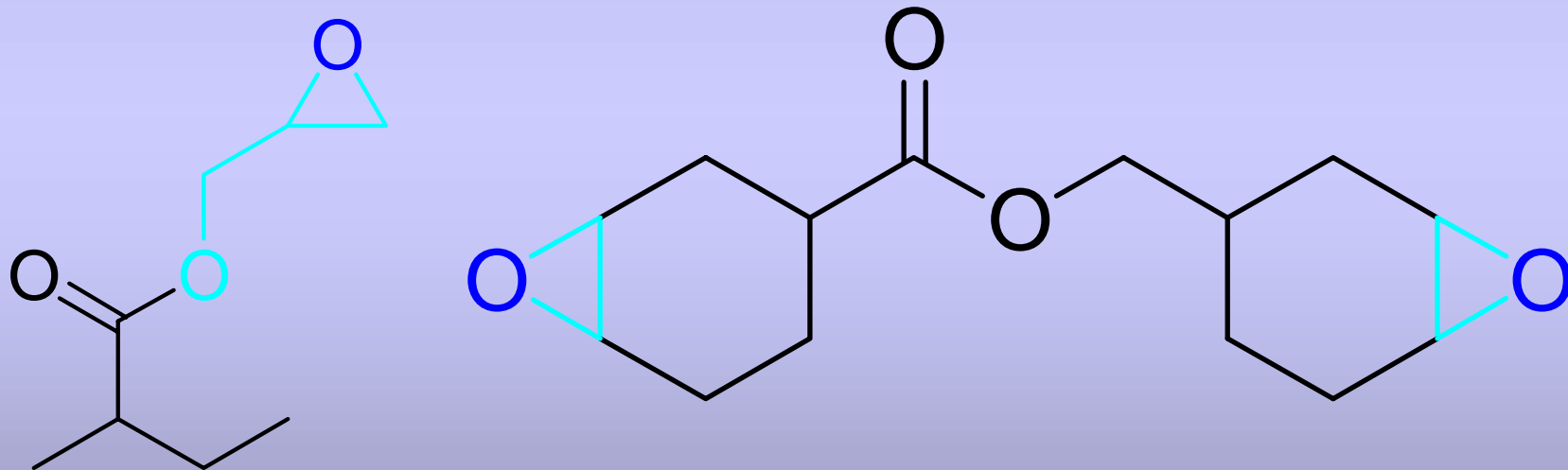
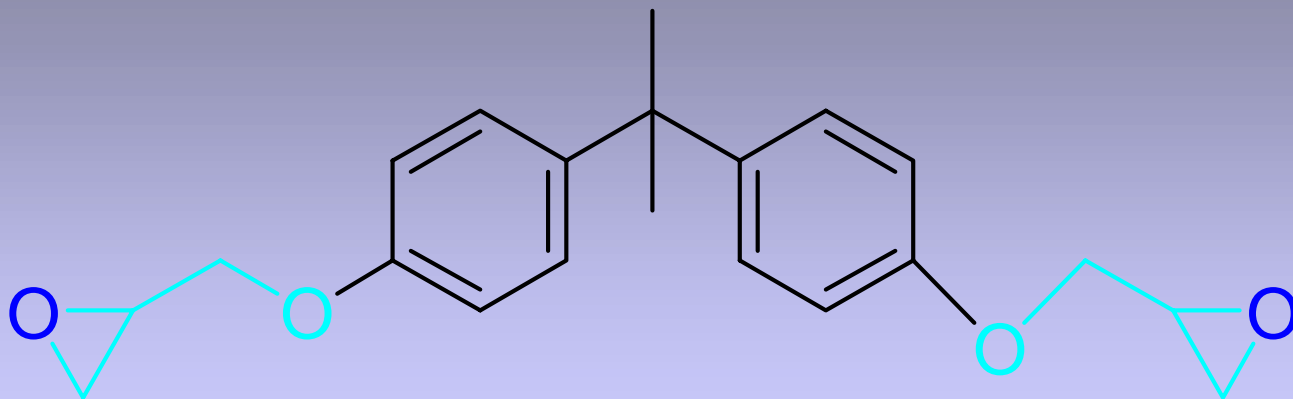
ADHESION

CORROSION

EXTERIOR DURABILITY

WATER RESISTANCE

EPOXY RESINS

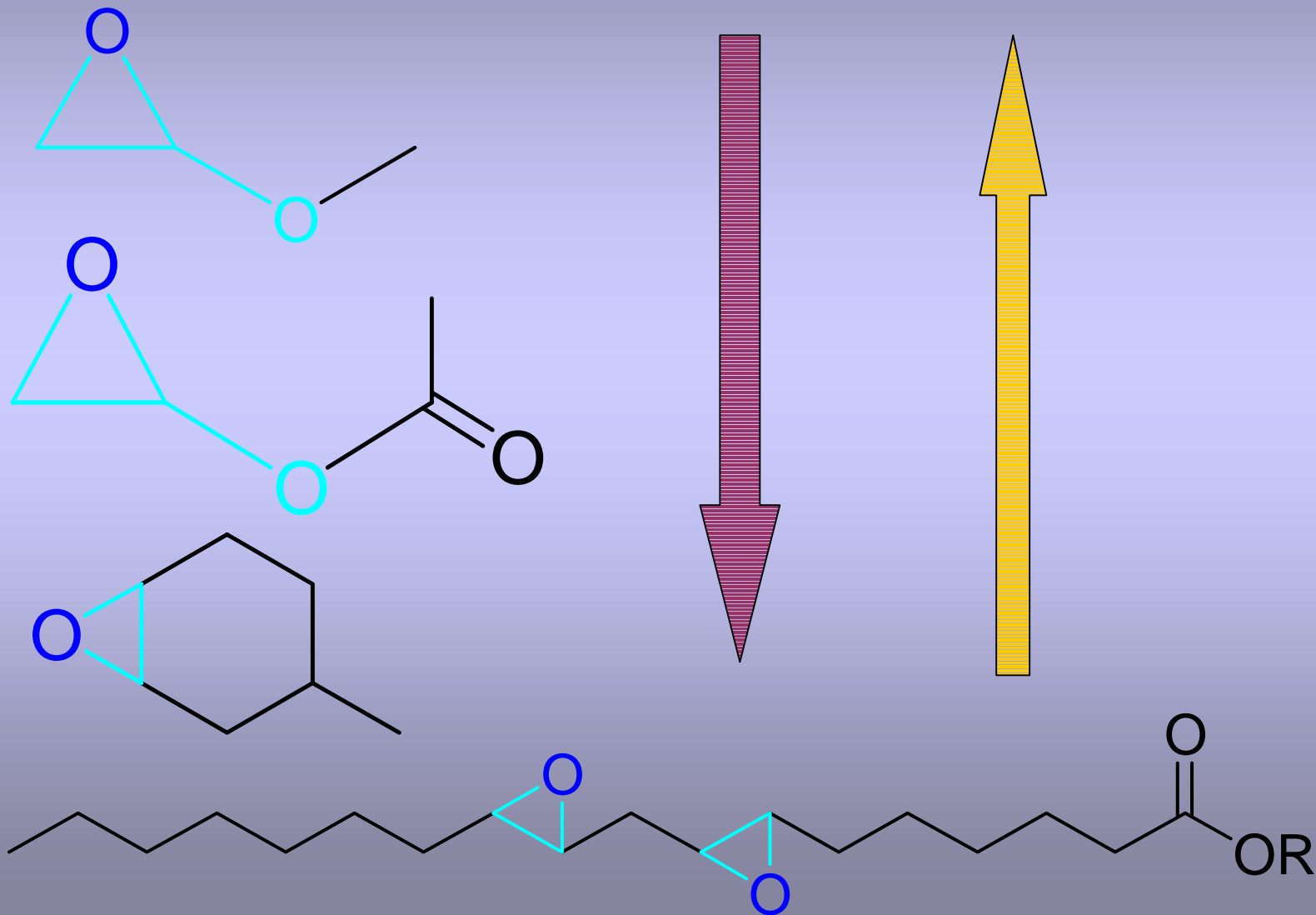


CATALYSTS USED EPOXY SYSTEMS

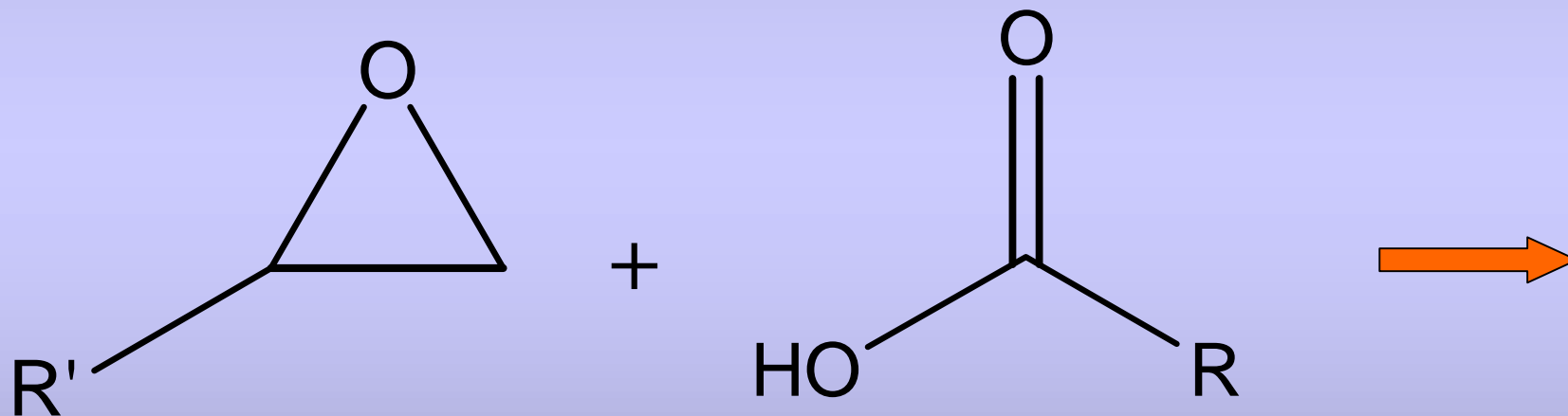
Acid

Base

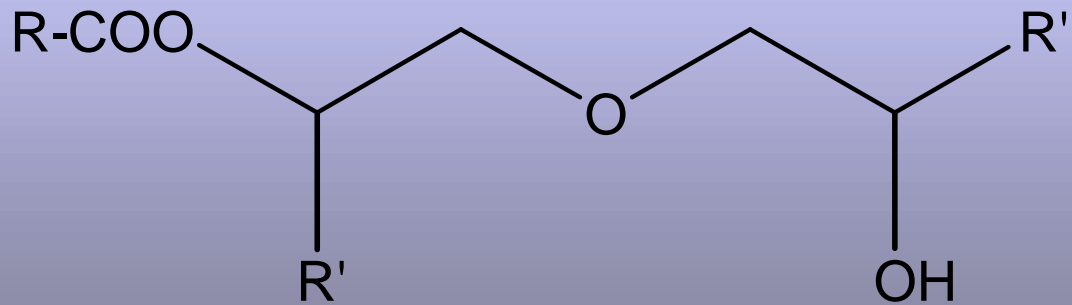
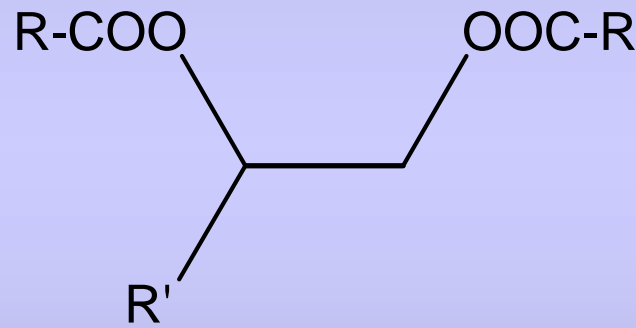
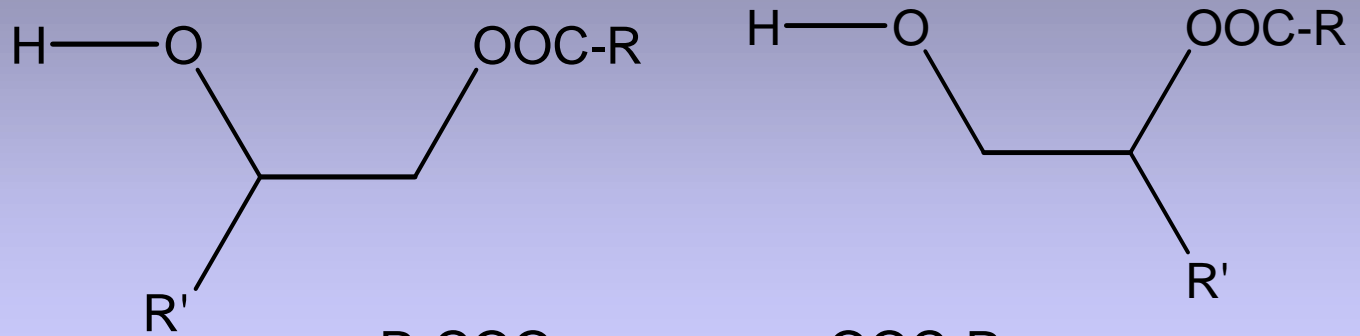
Metal



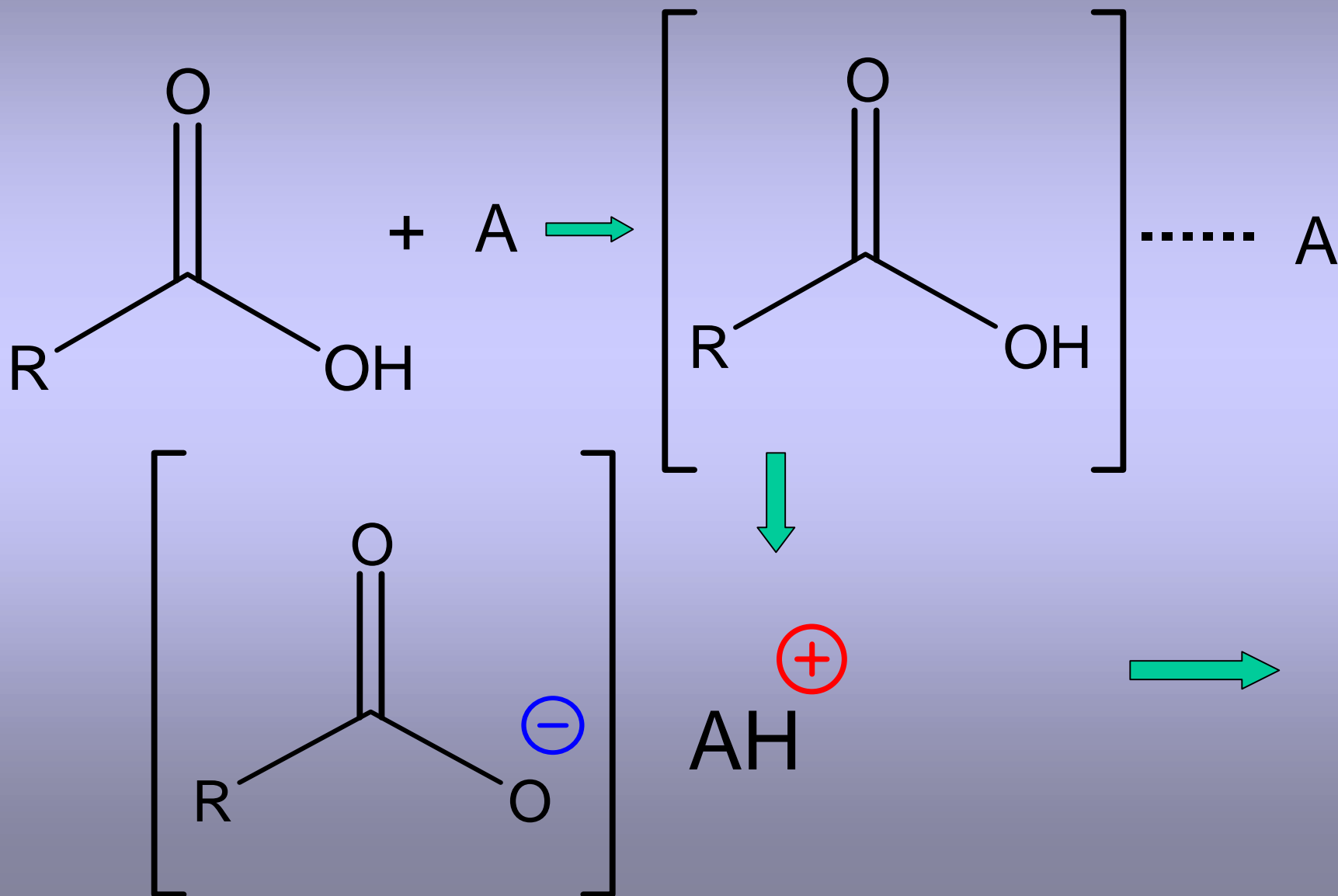
REACTION OF EPOXY WITH CARBOXYL UNCATALYZED



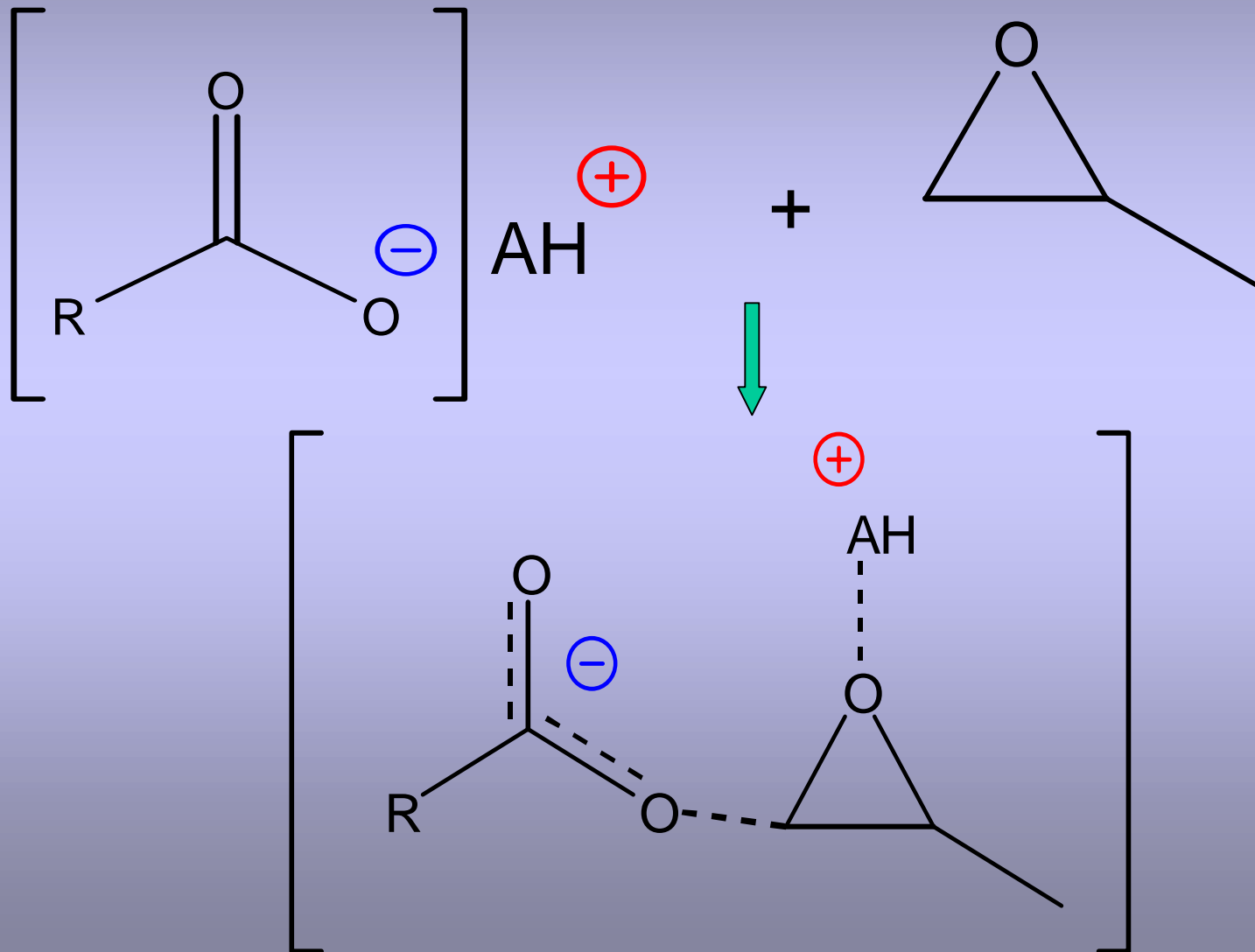
REACTION PRODUCTS EPOXY-CARBOXYL



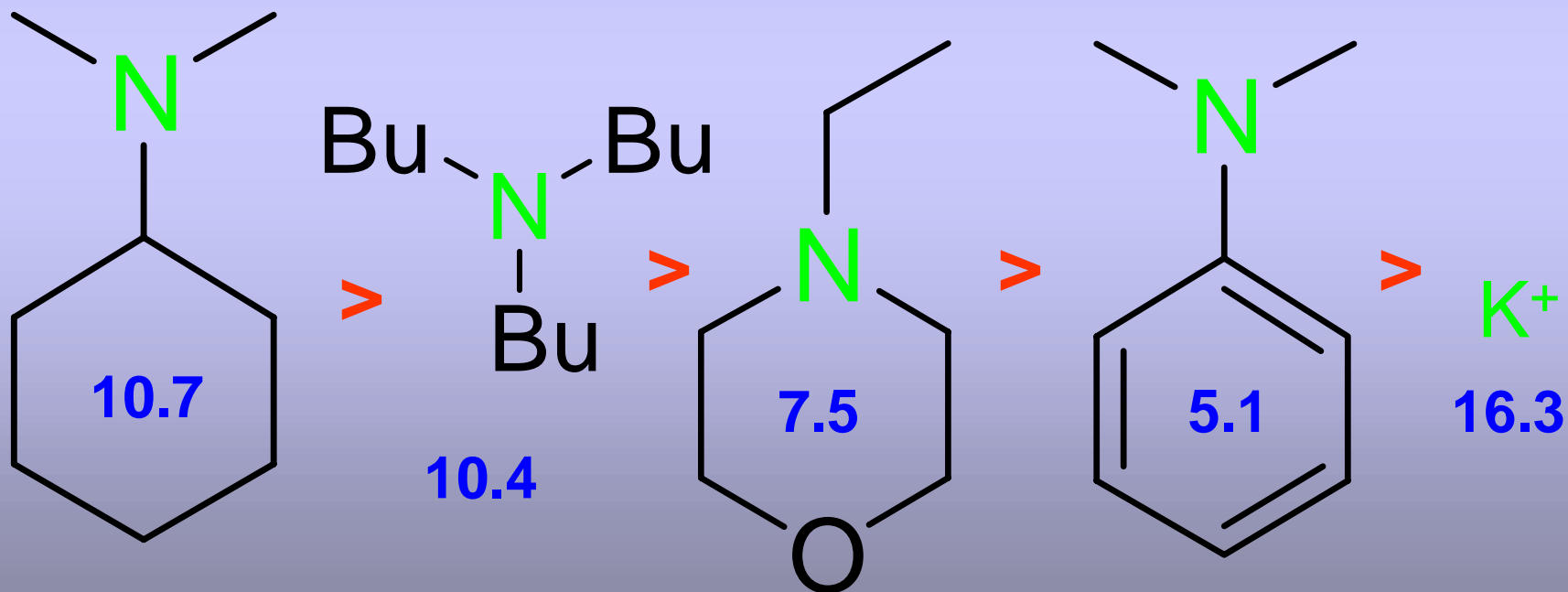
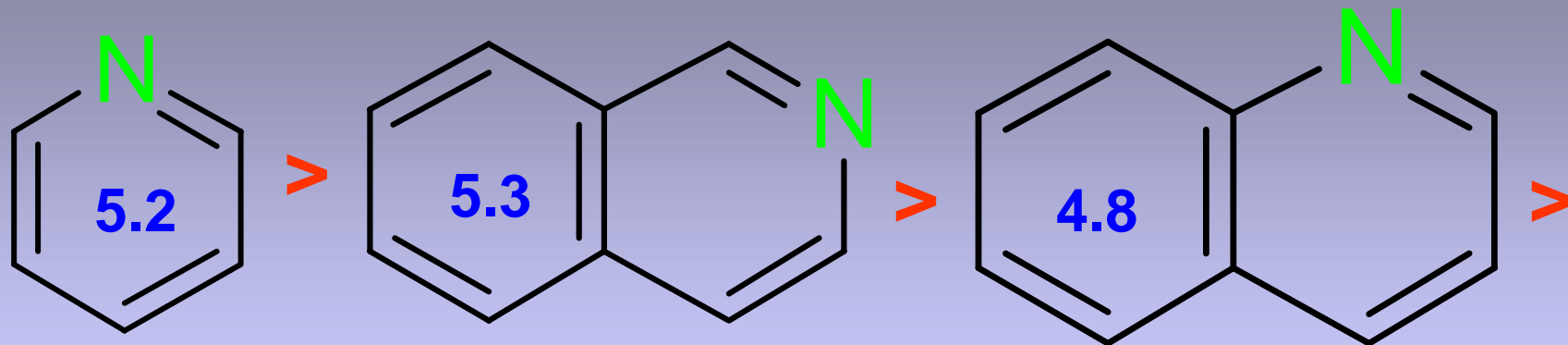
REACTION OF EPOXY WITH CARBOXYL t-AMINE CATALYSIS



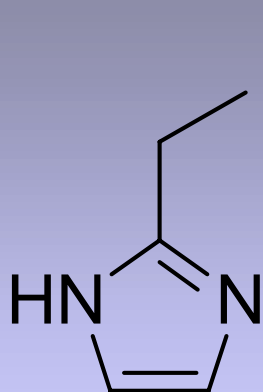
REACTION OF EPOXY WITH CARBOXYL t-AMINE CATALYSIS



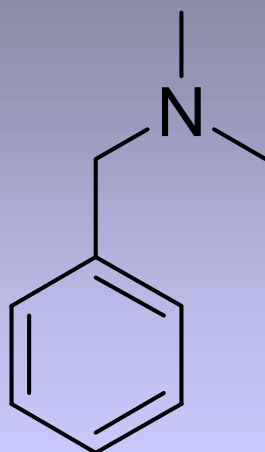
CATALYSTS USED EPOXY SYSTEMS



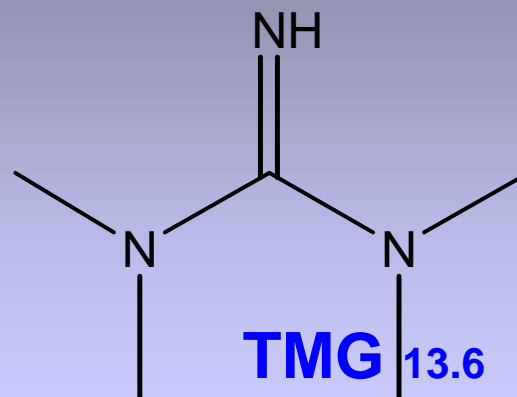
AMINE CATALYST USED IN THIS STUDY



2E-IMID 7.0



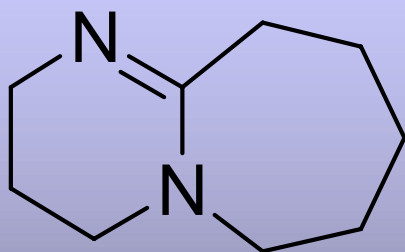
DMBA 8.8



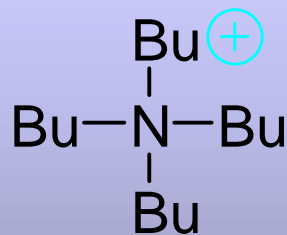
TMG 13.6



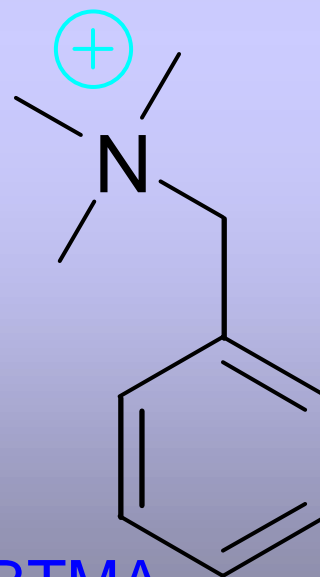
DBN 13.1



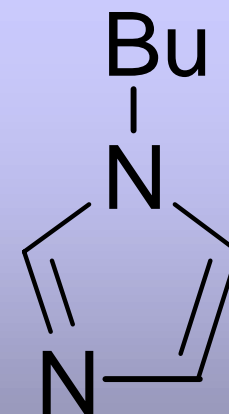
DBU 12.8



TBA



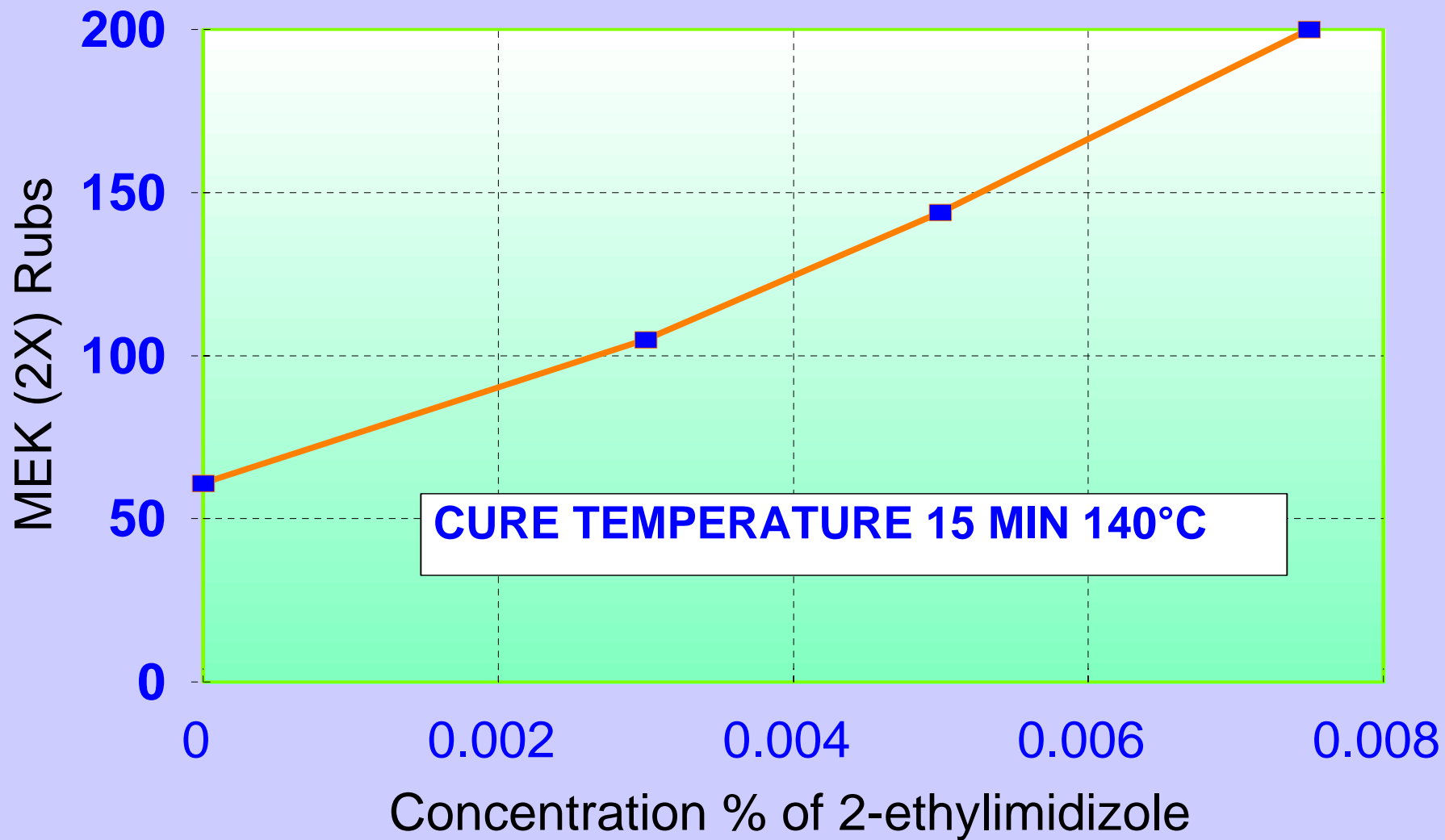
BTMA



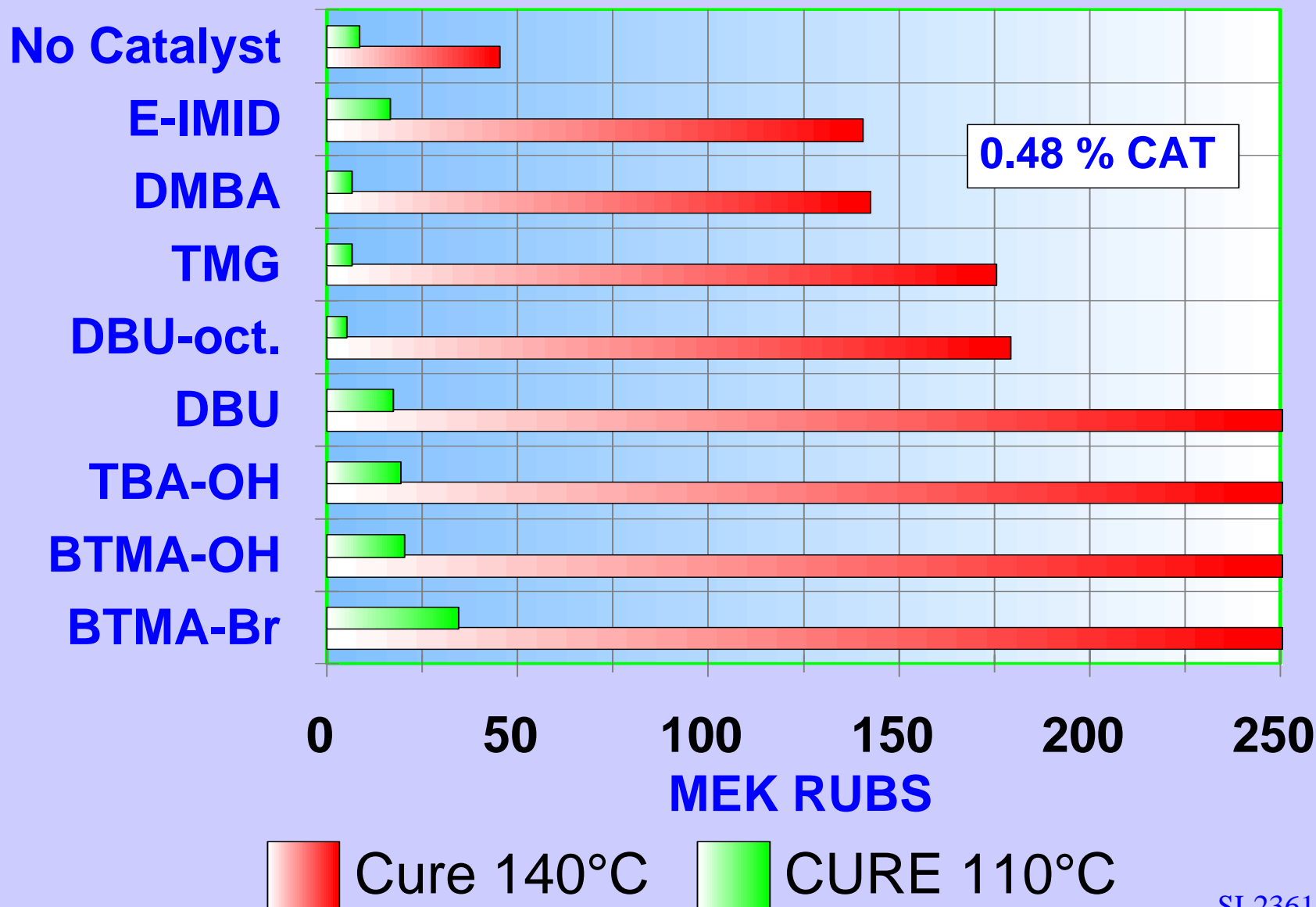
1B-IMID 7.1

GLYCIDYL ESTER ACRYLIC/COOH

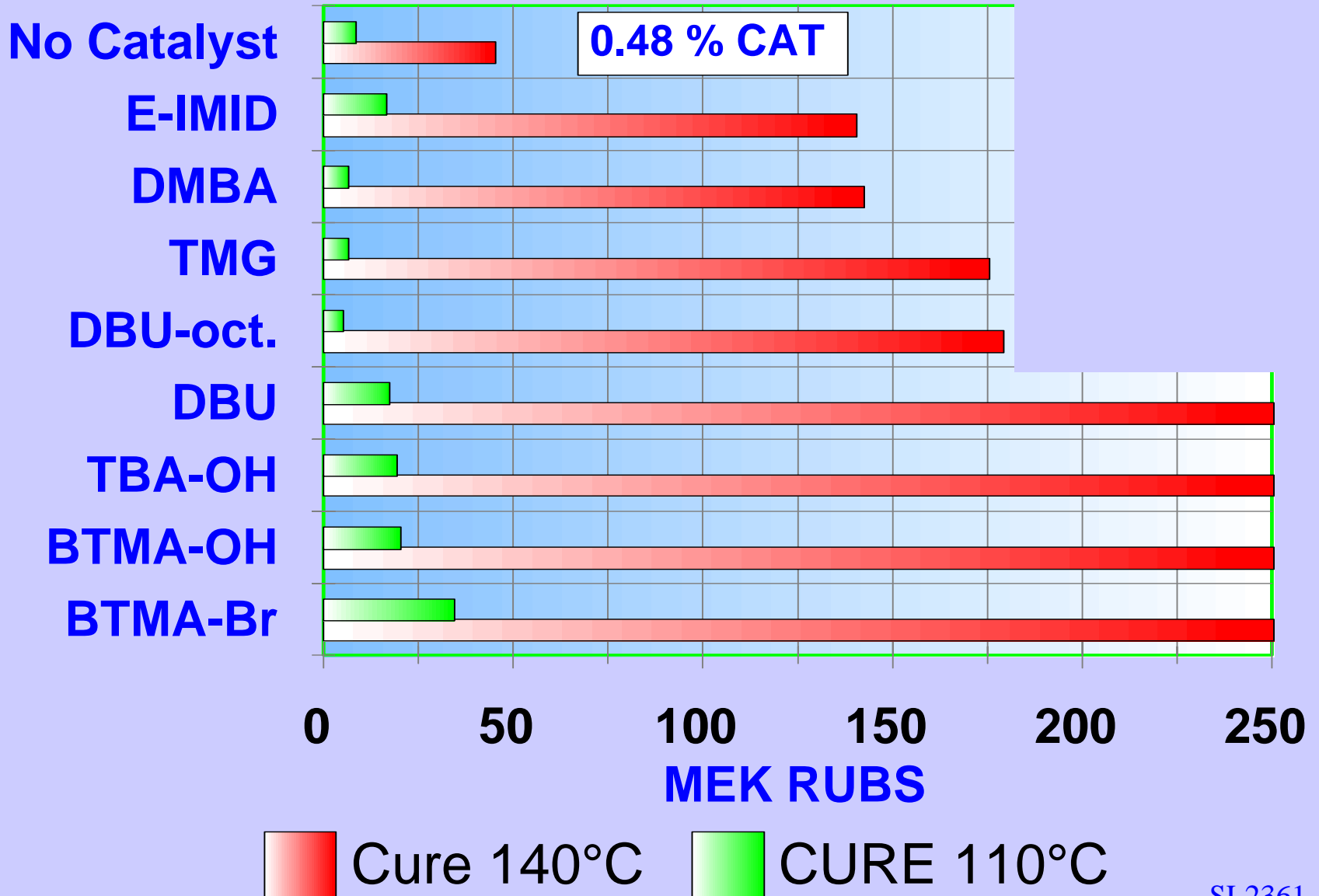
2-ETHYLIMIDAZOLE



GLYCIDYL ACRYLIC/COOH

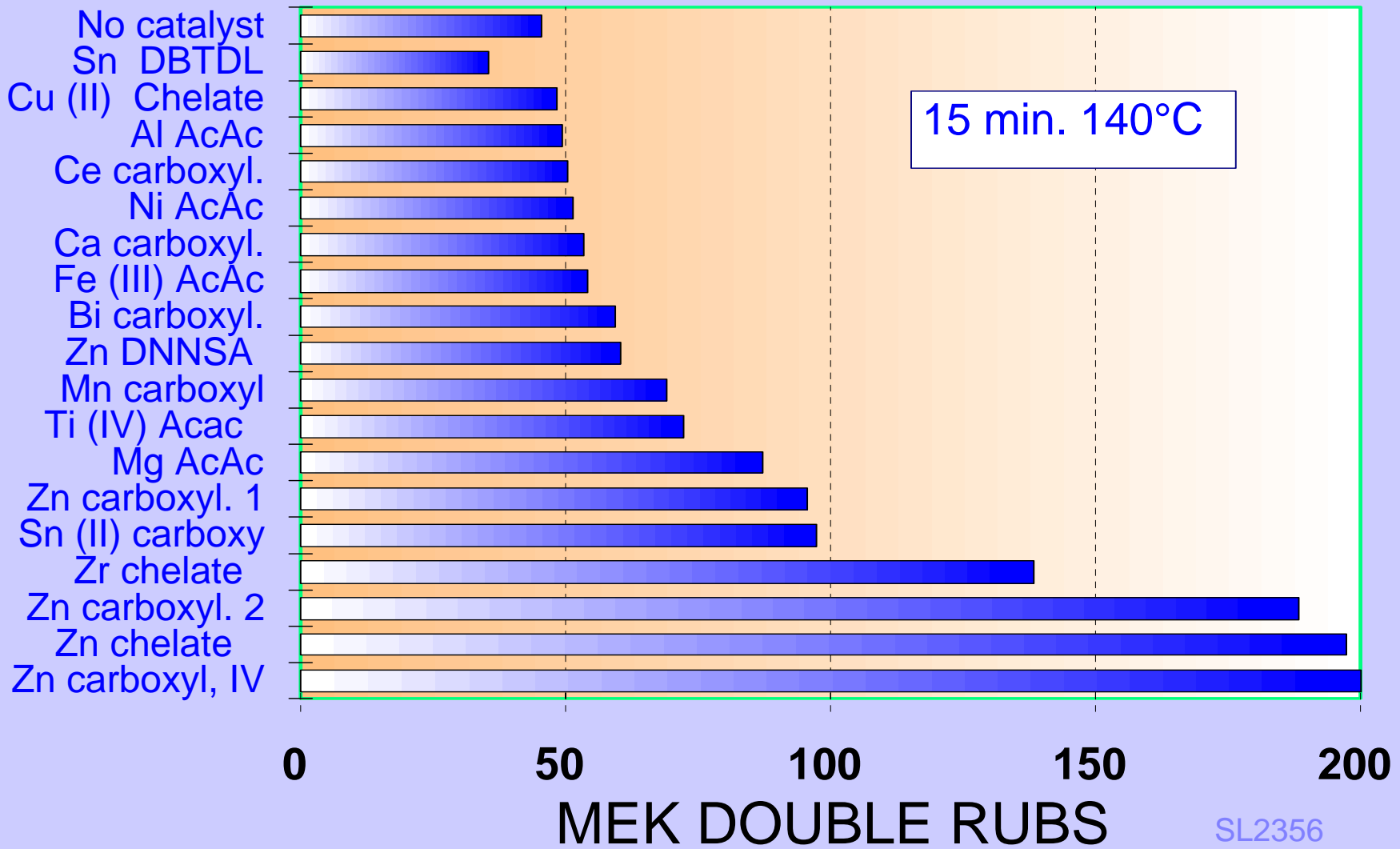


GLYCIDYL ACRYLIC/COOH

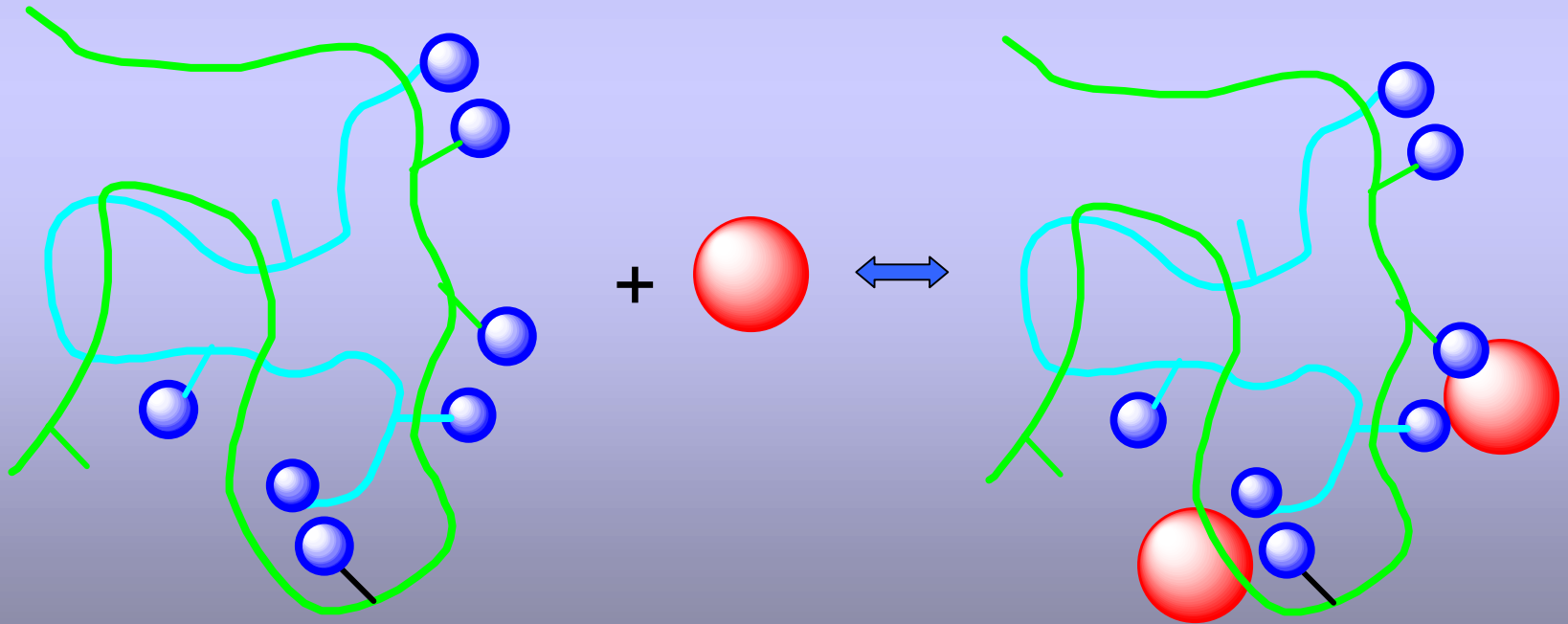
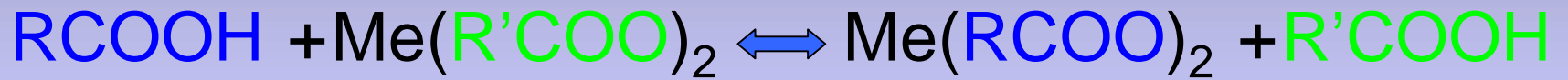


GLYCIDYL ACRYLIC/COOH

METAL CATALYST, 0.28 % Me

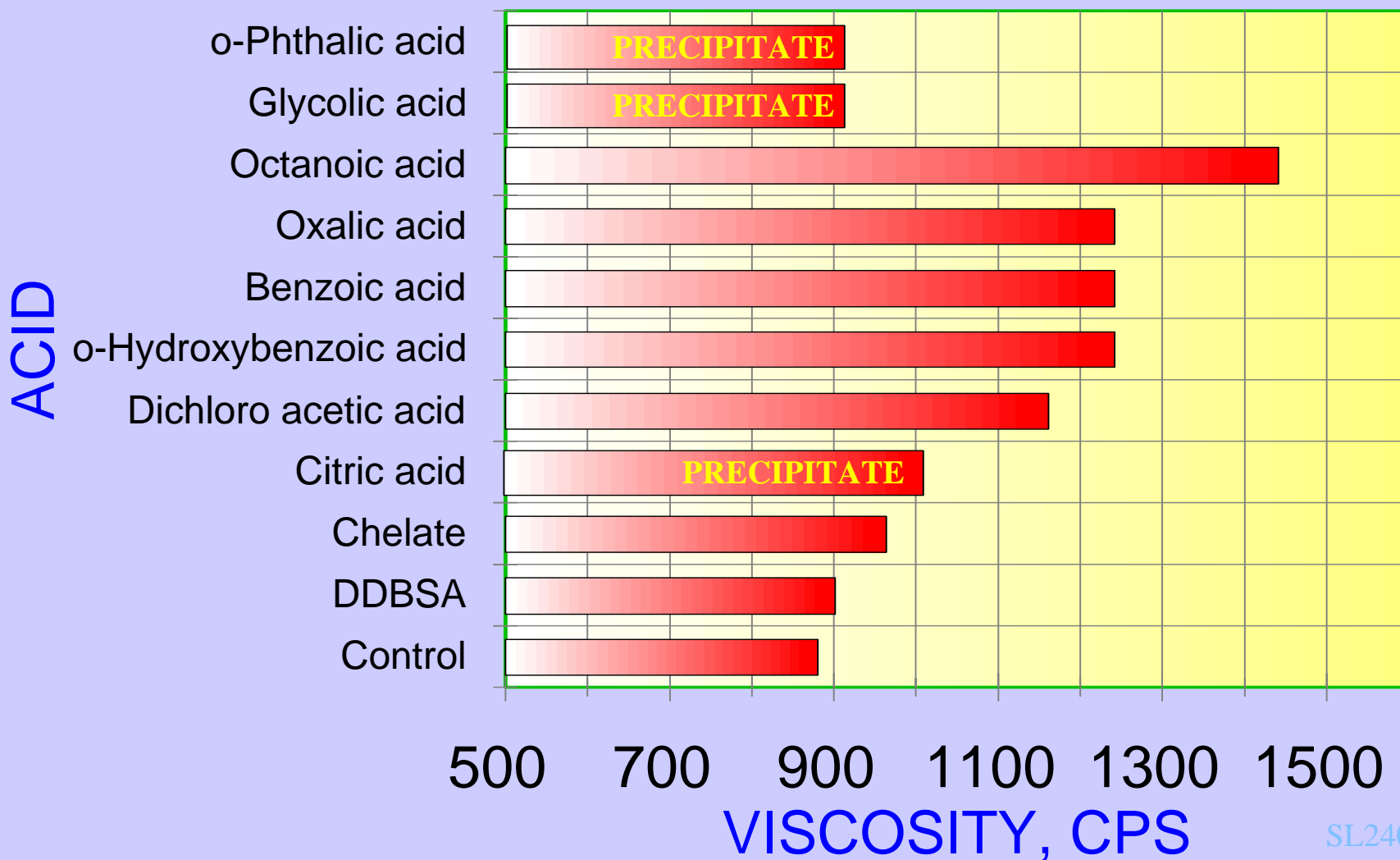


METAL CATALYSTS



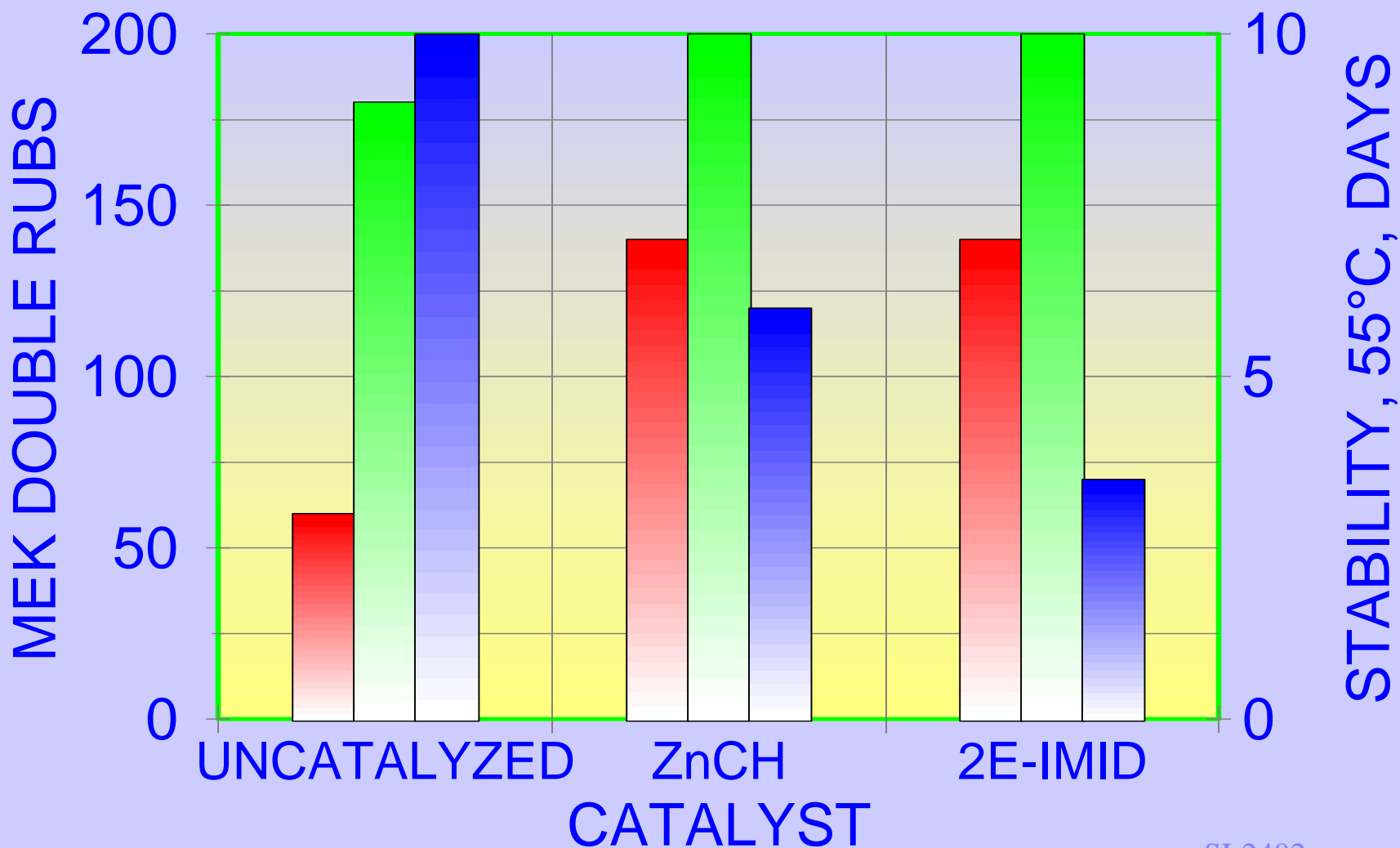
ACRYLIC COOH FUNCTIONAL

ZINC SALTS 0.4 % Zn



GLYCIDYL ESTER ACRYLIC/COOH

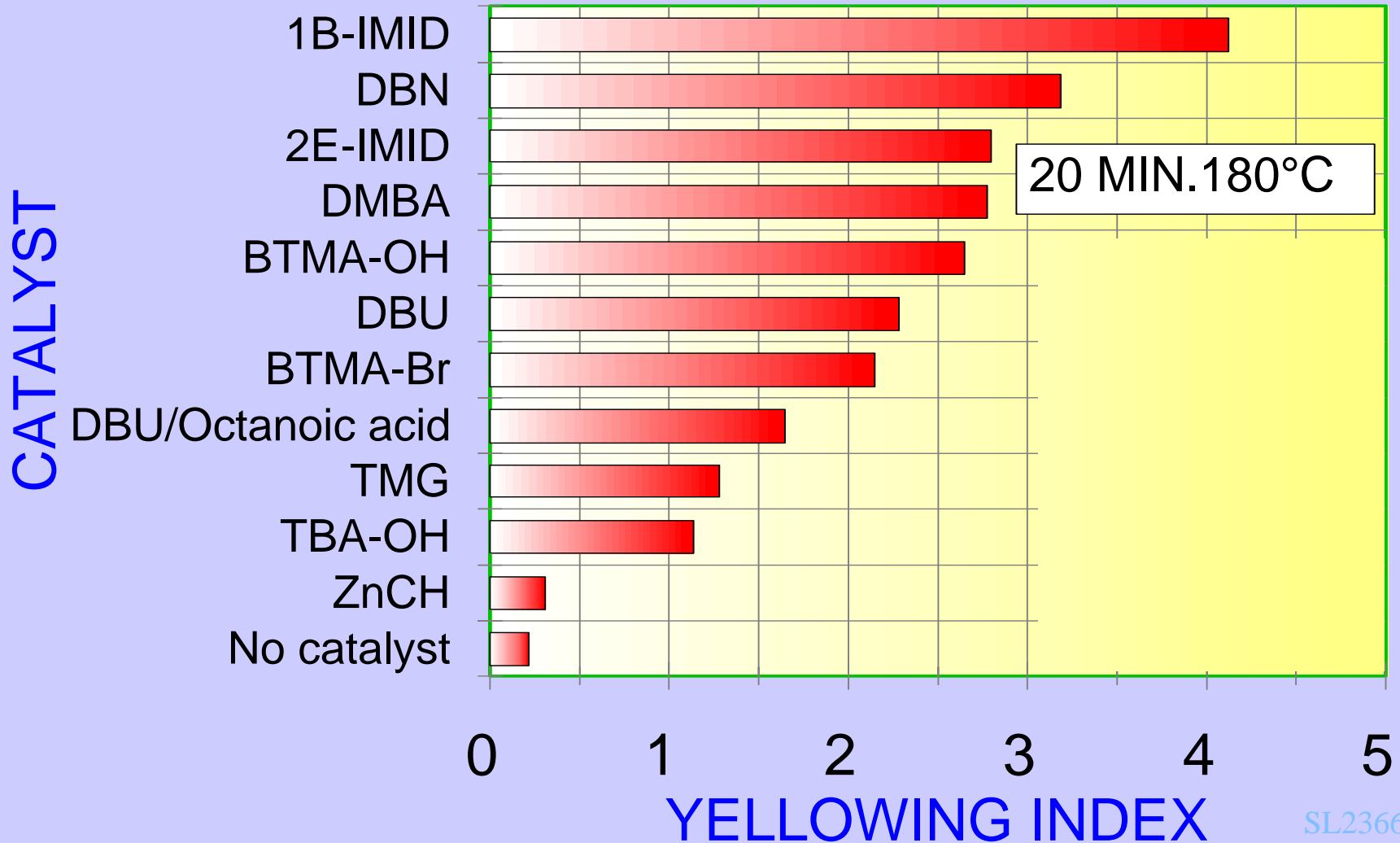
ZnCH (0.24 %), 2ETH IMIDAZOLE(0.48 %)



SL2402

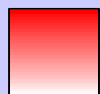
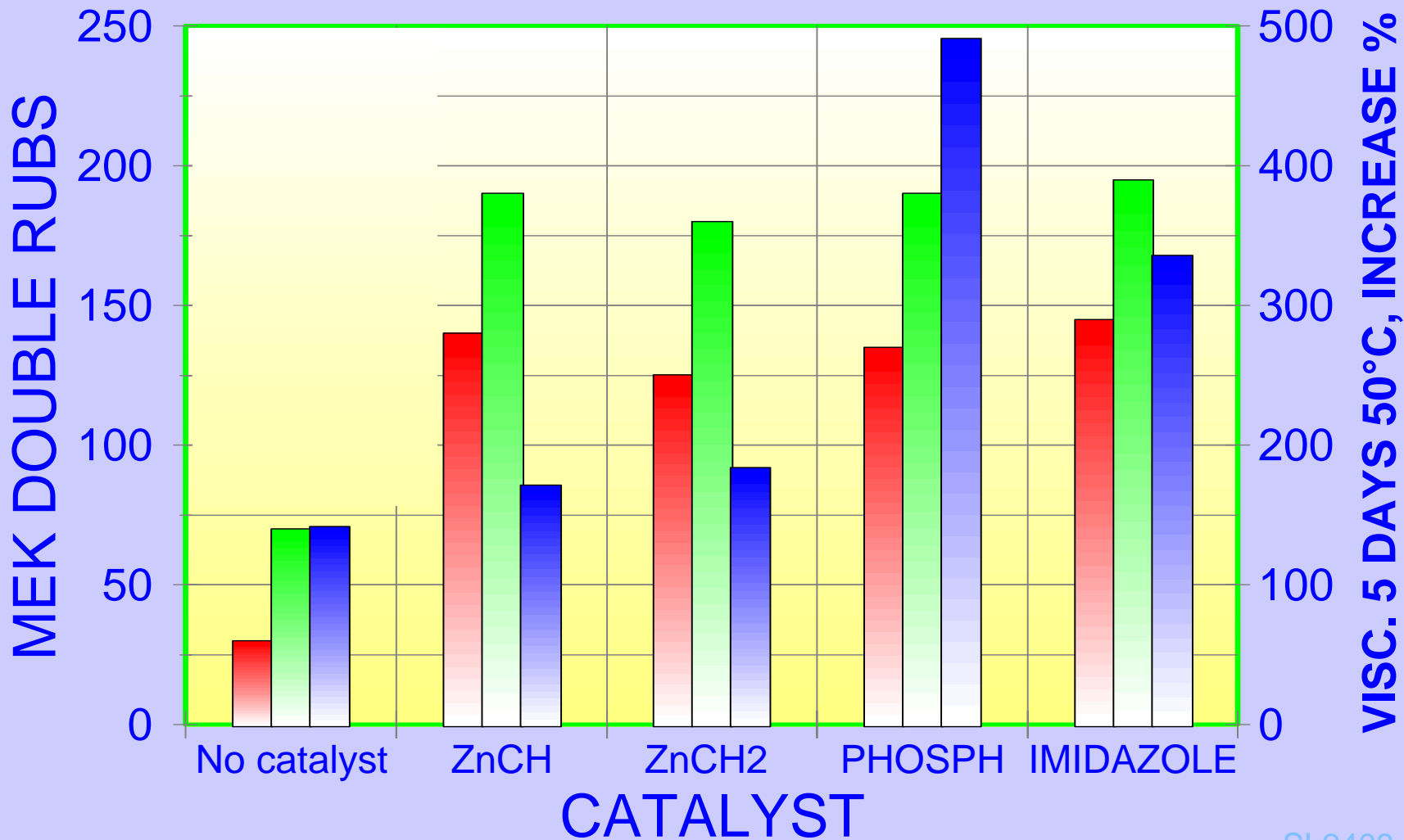
MEK 140°C MEK 150°C STABILITY

YELLOWING EPOXY/CARBOXYL GLYCIDYL ESTER -COOH ACRYLIC

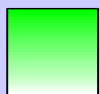


PE COOH/BIS A DIGLYCIDYL

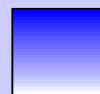
ZnCH 0.25 %, Amine 0.005 %



150°C



220°C



VISCOSITY

SL2403

BIS A EPOXY / ACRYLIC COOH

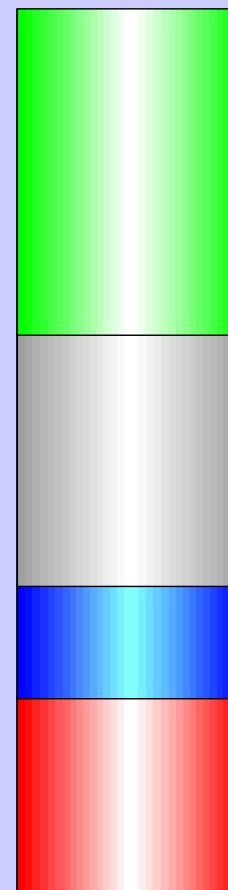
Equiv. Weight Epoxy 525, Acrylic 1150

Solvent (36.7)

Titanium dioxide (28.4)

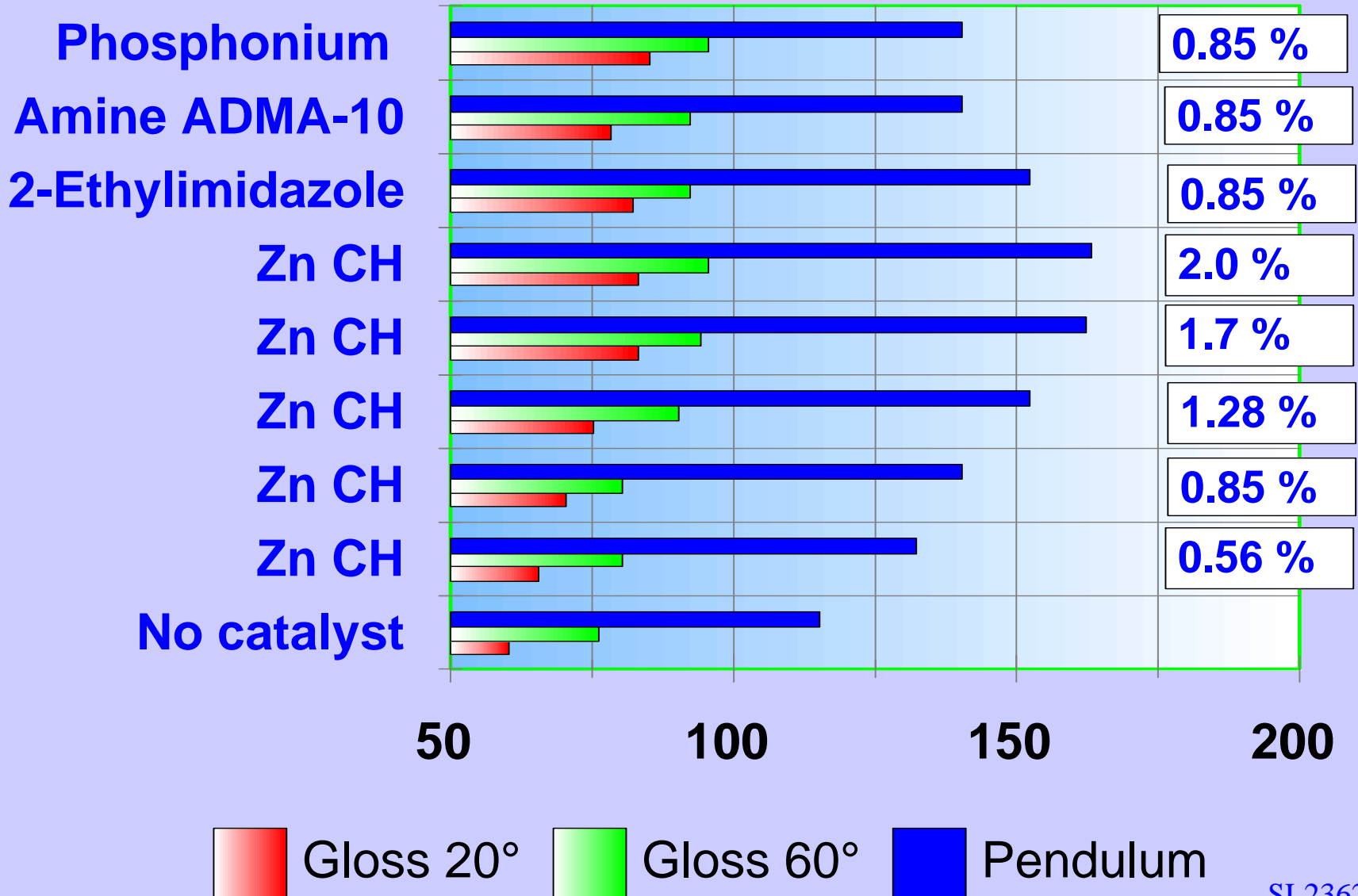
Epoxy (12.8)

Acrylic (21.9)



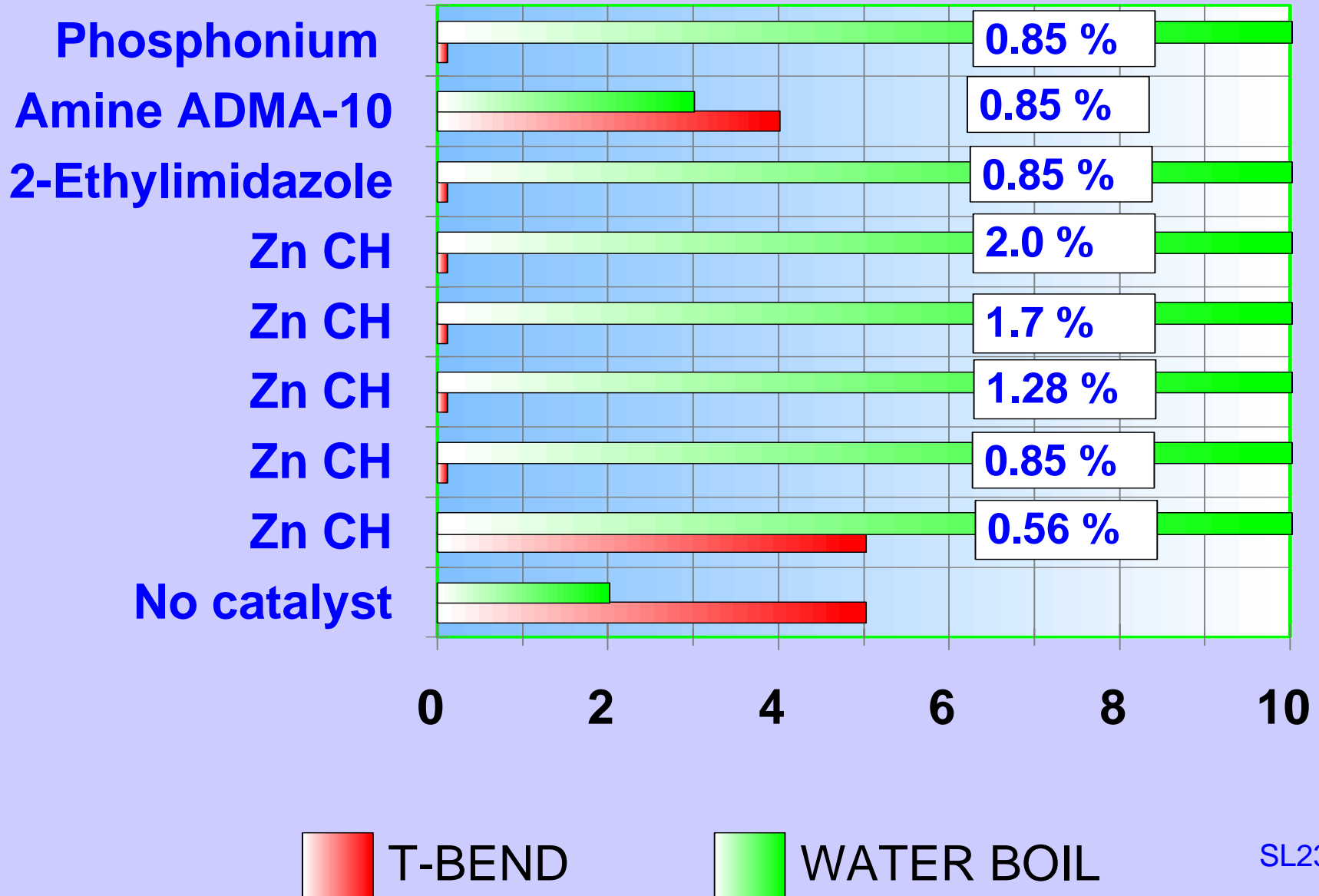
BIS A EPOXY / ACRYLIC COOH

TiO2 pig. 5 micron, 6' 204°C



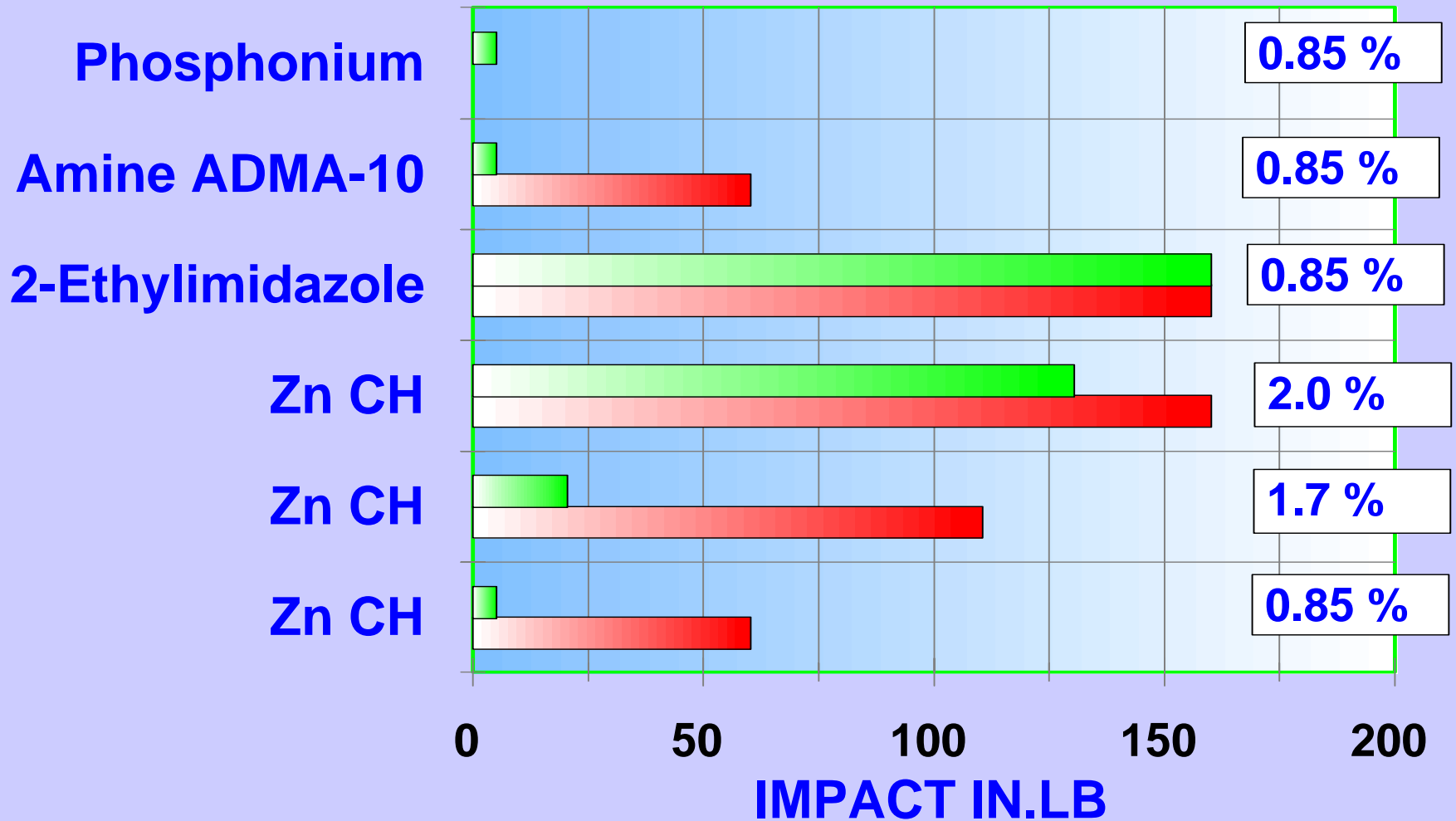
BIS A EPOXY / ACRYLIC COOH

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

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

Phosphonium salt

Amine ADMA-10

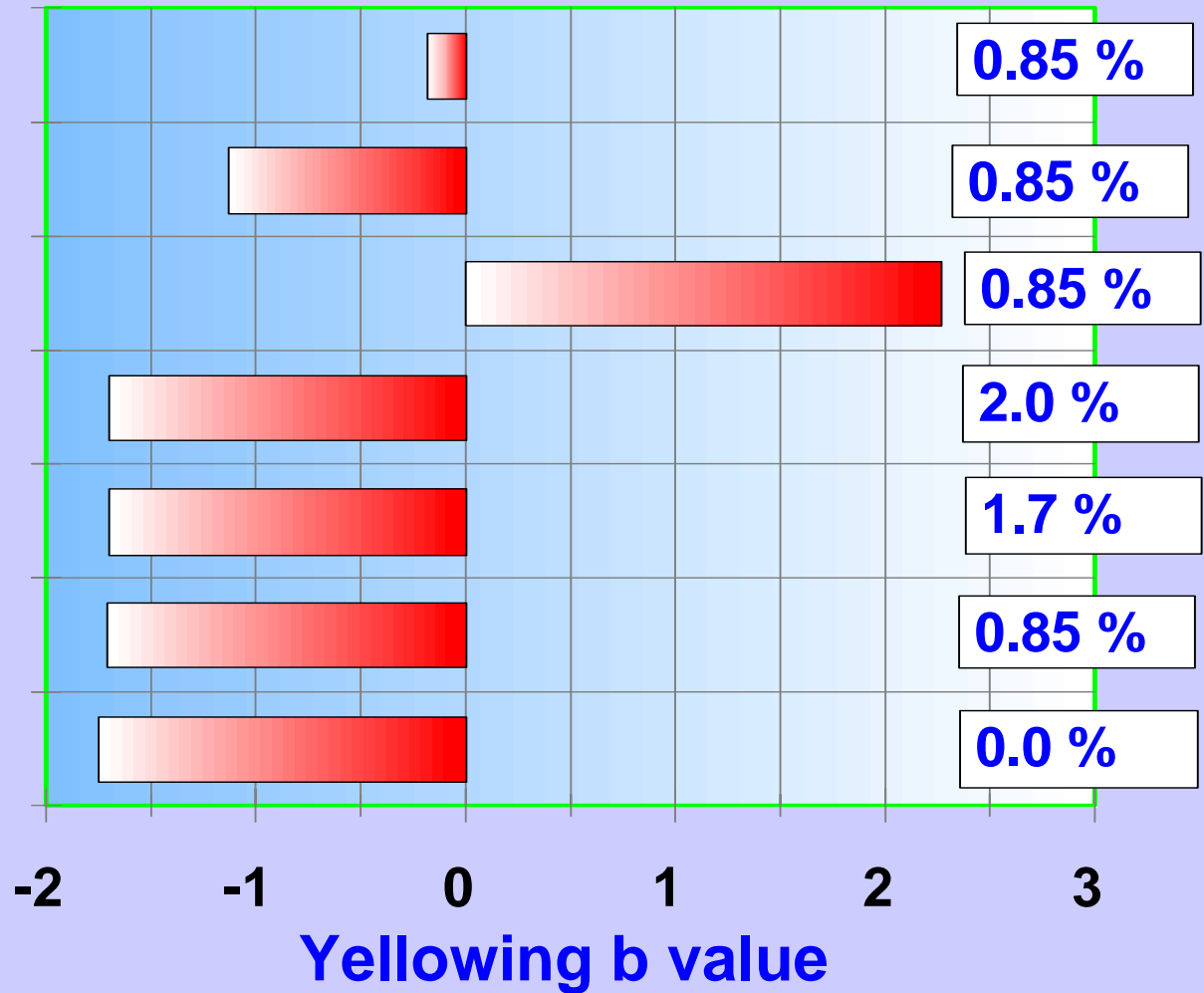
2-Ethylimidazole

ZnCH

ZnCH

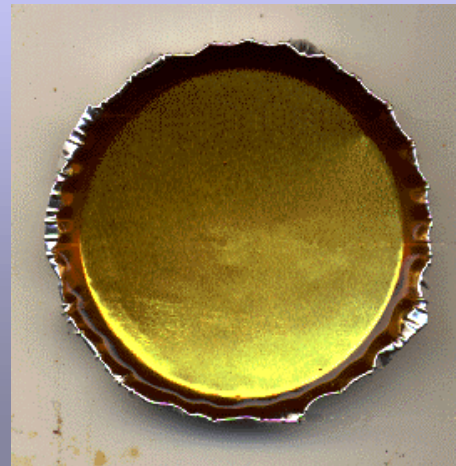
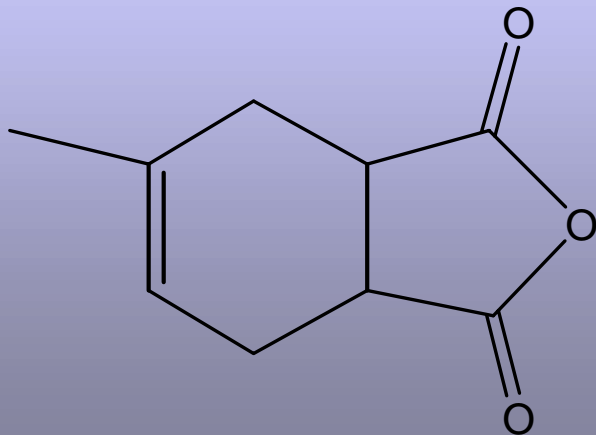
ZnCH

Uncatalyzed



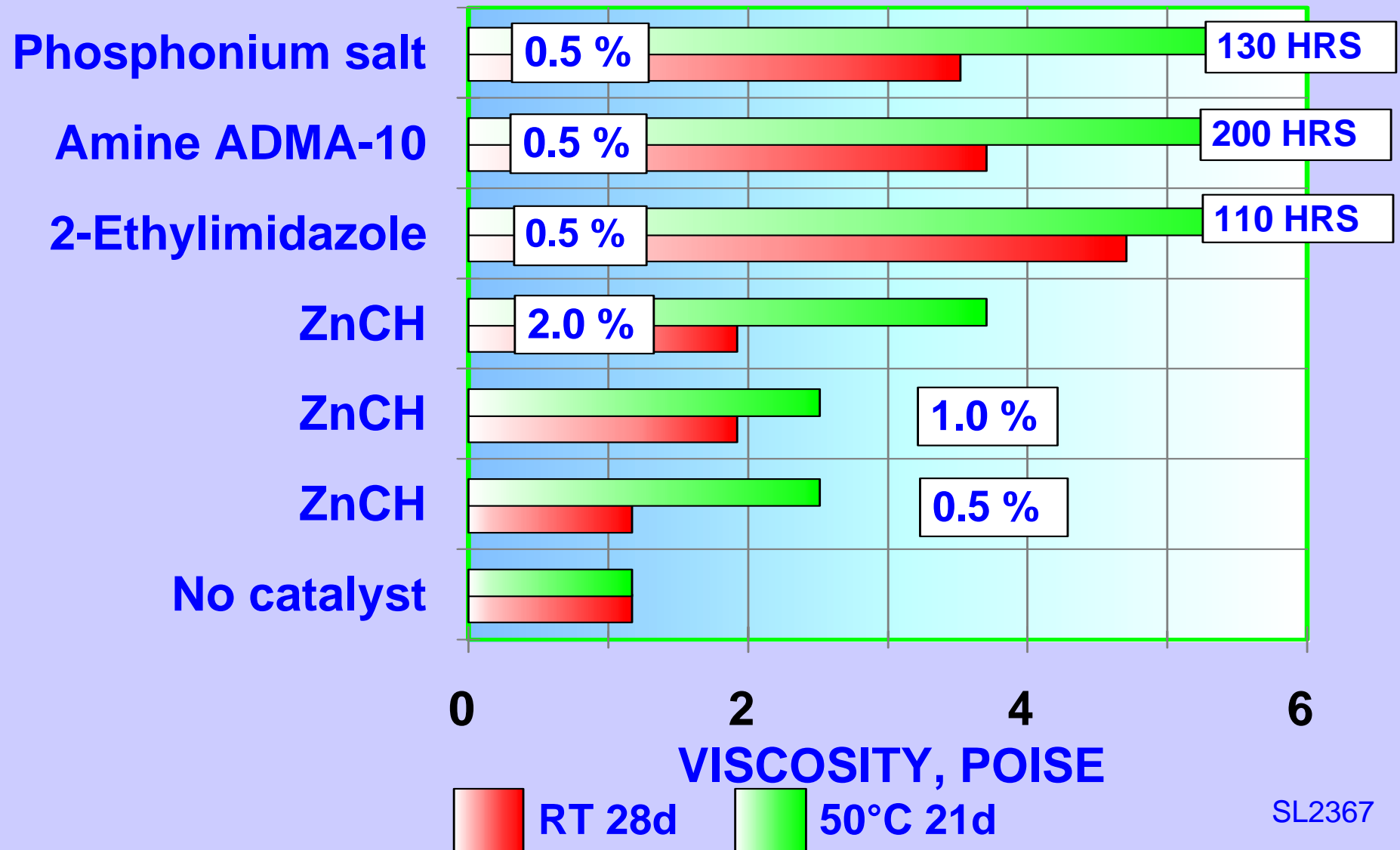
BIS A EPOXY LIQUID/ MTHPA

	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

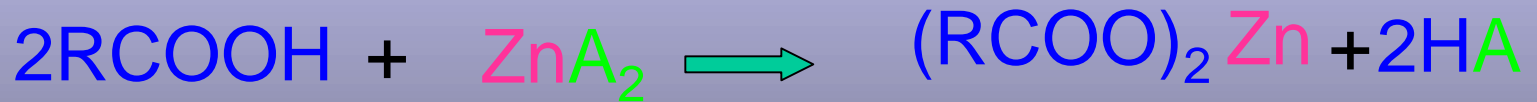
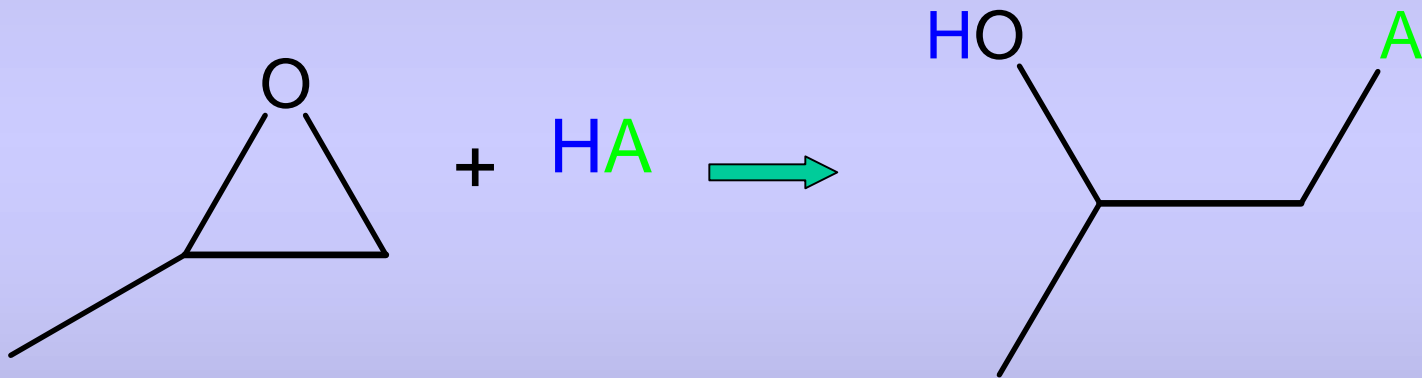
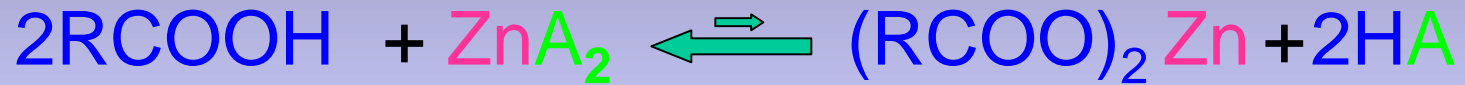


BIS A EPOXY / ACRYLIC COOH

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



WWW.KINGINDUSTRIES.COM
WWW.WERNERBLANK.COM
WBLANK@KINGINDUSTRIES.COM