Mankiewicz UV-Coatings
创美凯威奇UV涂料

UV-Seminar Shanghai 13 & 14. March 2013
2013年3月13-14日 UV研讨会　上海

CYCON®

Content 内容

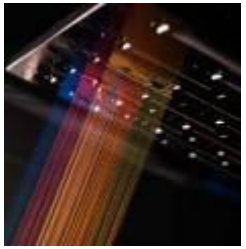
- **Principles of UV-Technology**
- **UV技术原理**
- UV Monocure Technology
- UV纯固化技术
  - ✓application advantages 应用优势
  - ✓Properties 性能
- Application on plastics interior
- •应用于塑料内饰产品
- Application on plastics exterior
- •应用于塑料外饰产品
- UV-on-metal作用于金属的UV

Principles of UV-technology UV技术原理

- since 1960s in the wood and furniture industry a filler is used which is based on UV
- 自20世纪60年代以来，木材和家具行业就已经通过UV使用填充物

- due to the high speed curing and the high scratch resistance this technology was extended to UV curable clear coats
- 由于具有快速固化和耐摩性好的优点，这项技术开始向可UV固化的清漆领域发展

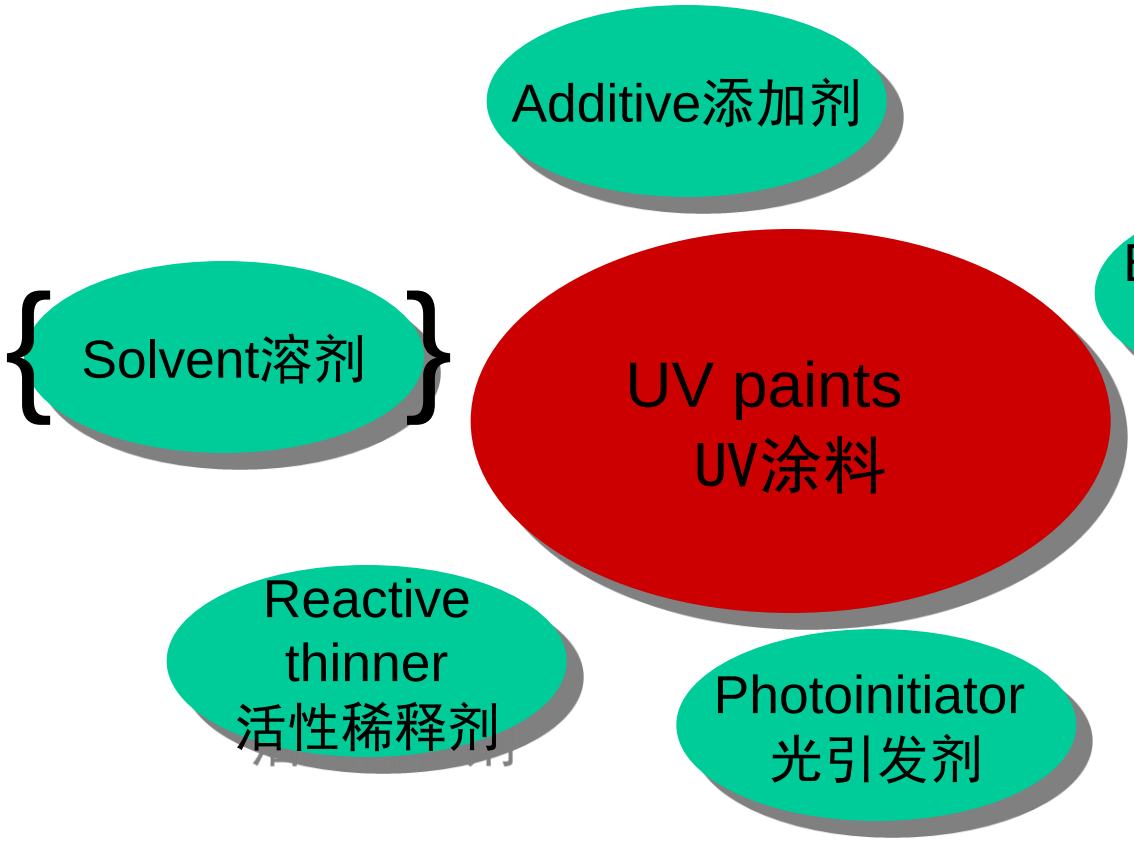
- since 1980s this technology is also used widely in the printing industry
- 自20世纪80年代以来，这项技术被广泛应用于印刷业



- in mid 90s UV-curable inkjet-systems were developed
- 90年代中期，UV光固化喷墨系统开发问世

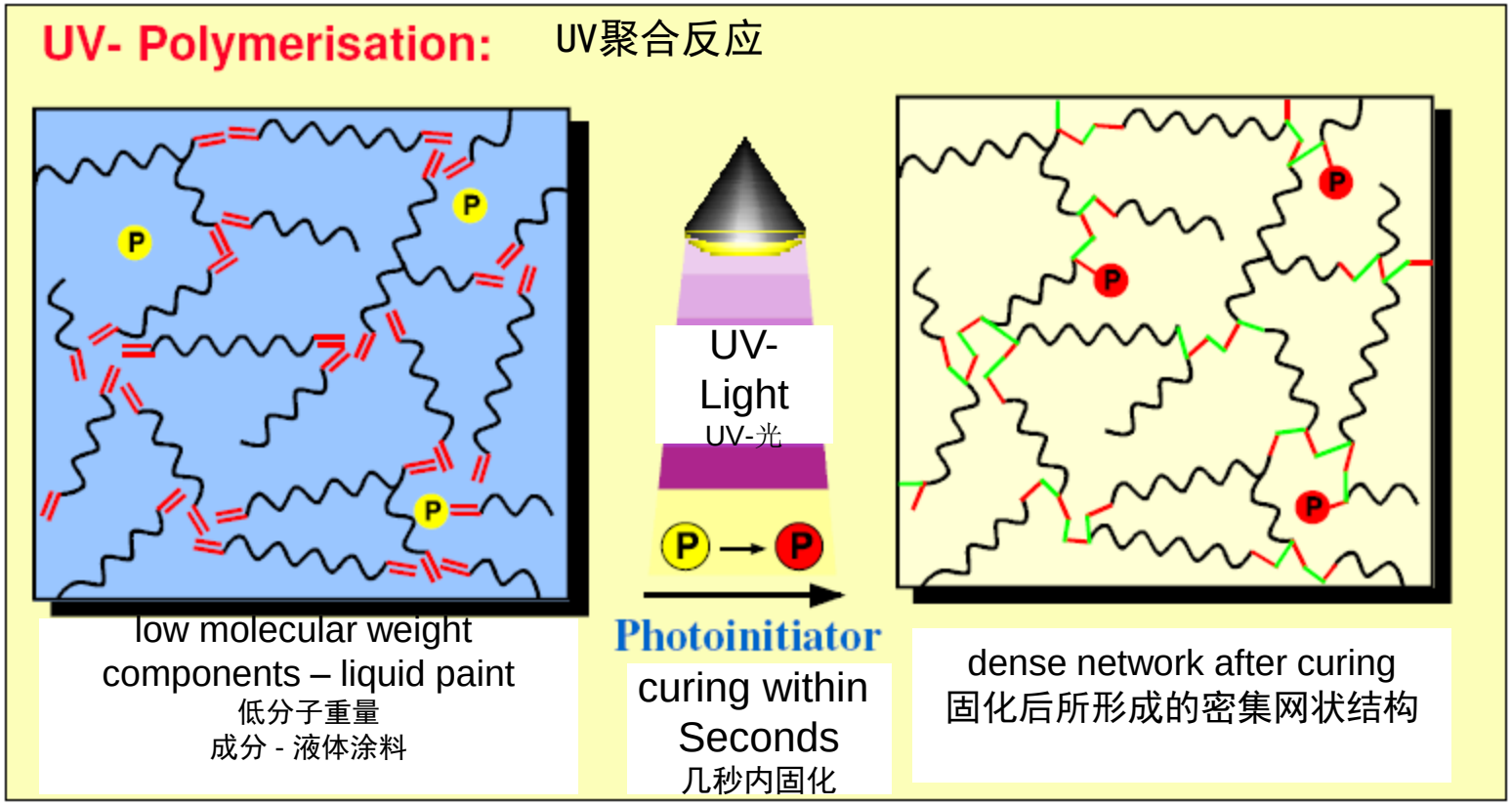
- since 2000 UV-systems are widely used also in plastics coatings
- 自2000年以来，UV系统还被广泛应用于塑料件的涂装

Principles of UV-technology UV技术原理



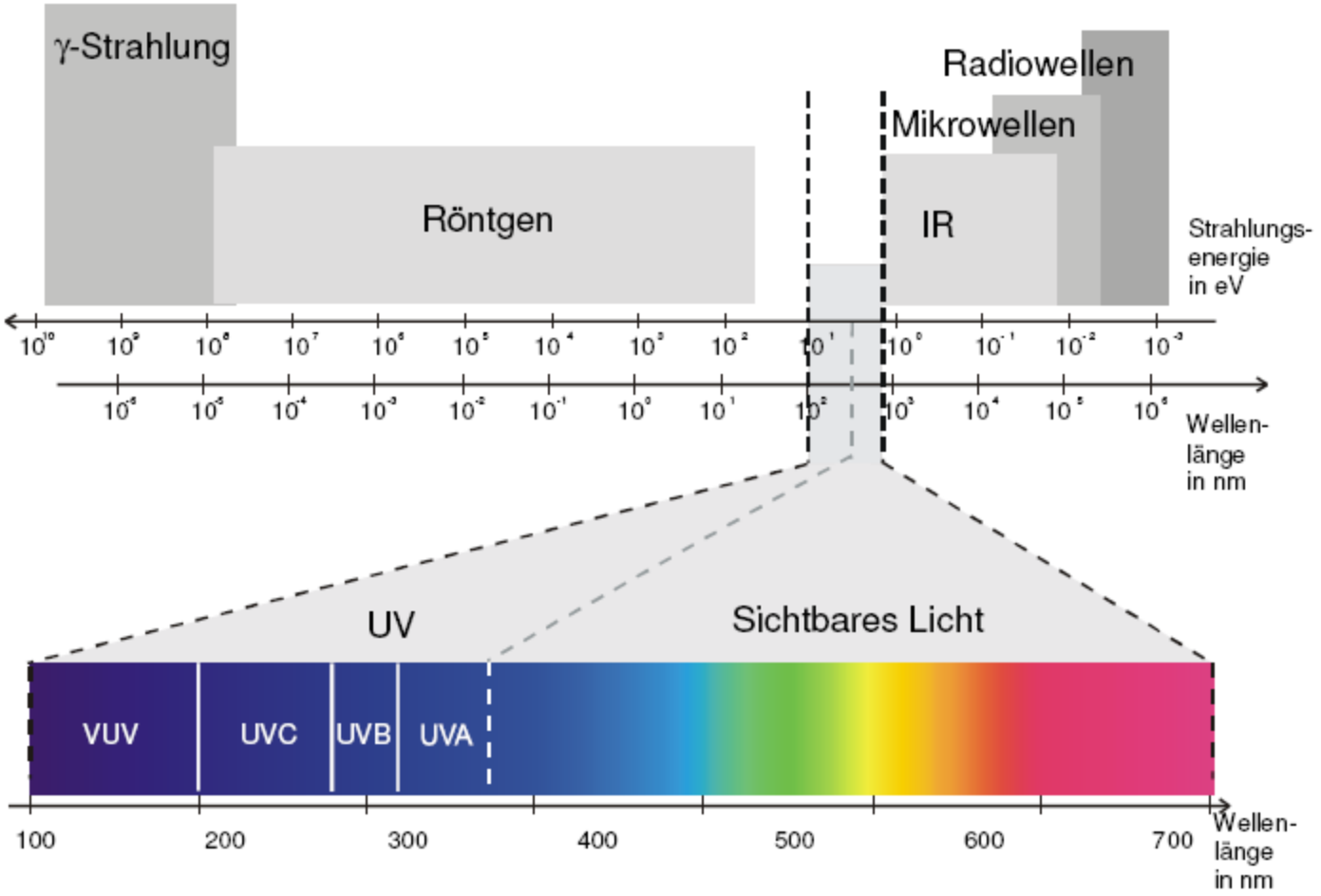
The photoinitiator is what makes UV paints different from otherpaint systems
正是光引发剂使UV涂料不同于其他涂料

Principles of UV-technology UV技术原理



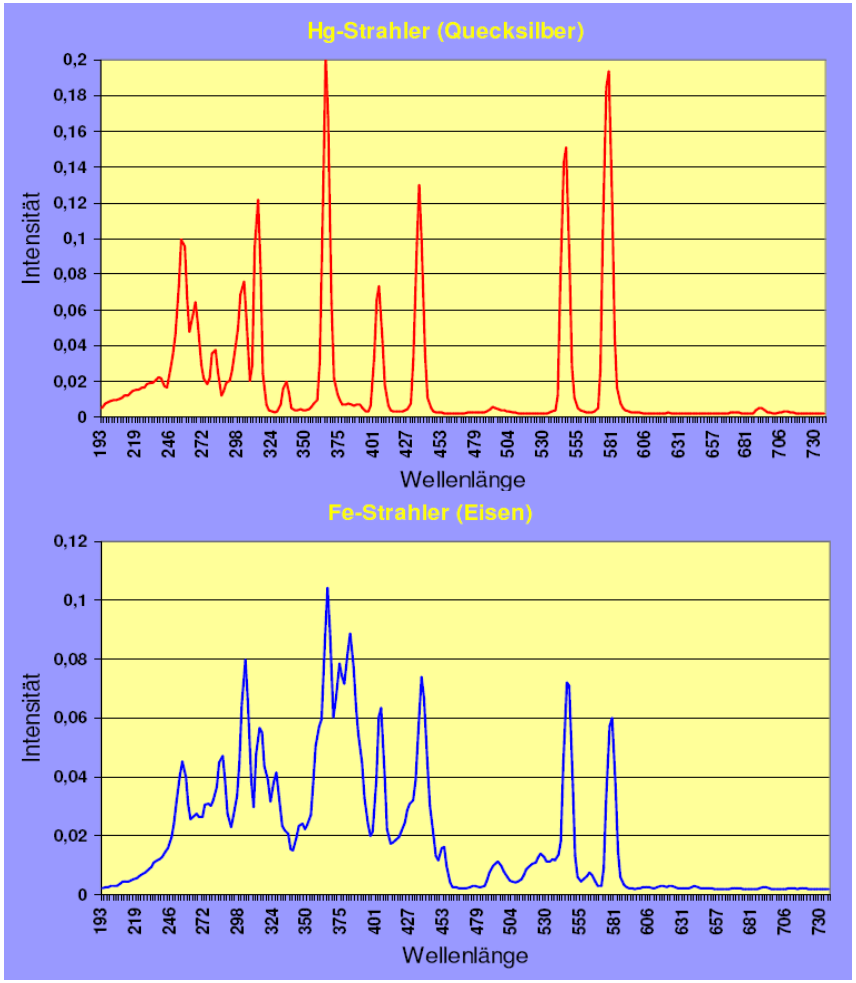
Principles of UV-technology
UV技术原理

Spectrum of UV light and visible light　　UV光和可见光的光谱



Principles of UV-technology
UV技术原理

Bulbs with different spectra:拥有不同光谱的灯泡：



Different UV paints require different lamp spectra
不同UV涂料，需要不同光谱的灯泡

Principles of UV-technology
UV技术原理

Dosage and intensity
能量和强度

Lamp power: absorbed electric power / arc length
(distance of electrodes) W/cm
灯泡功率：被吸收的电能/电弧长度（电极距离） 瓦/厘米

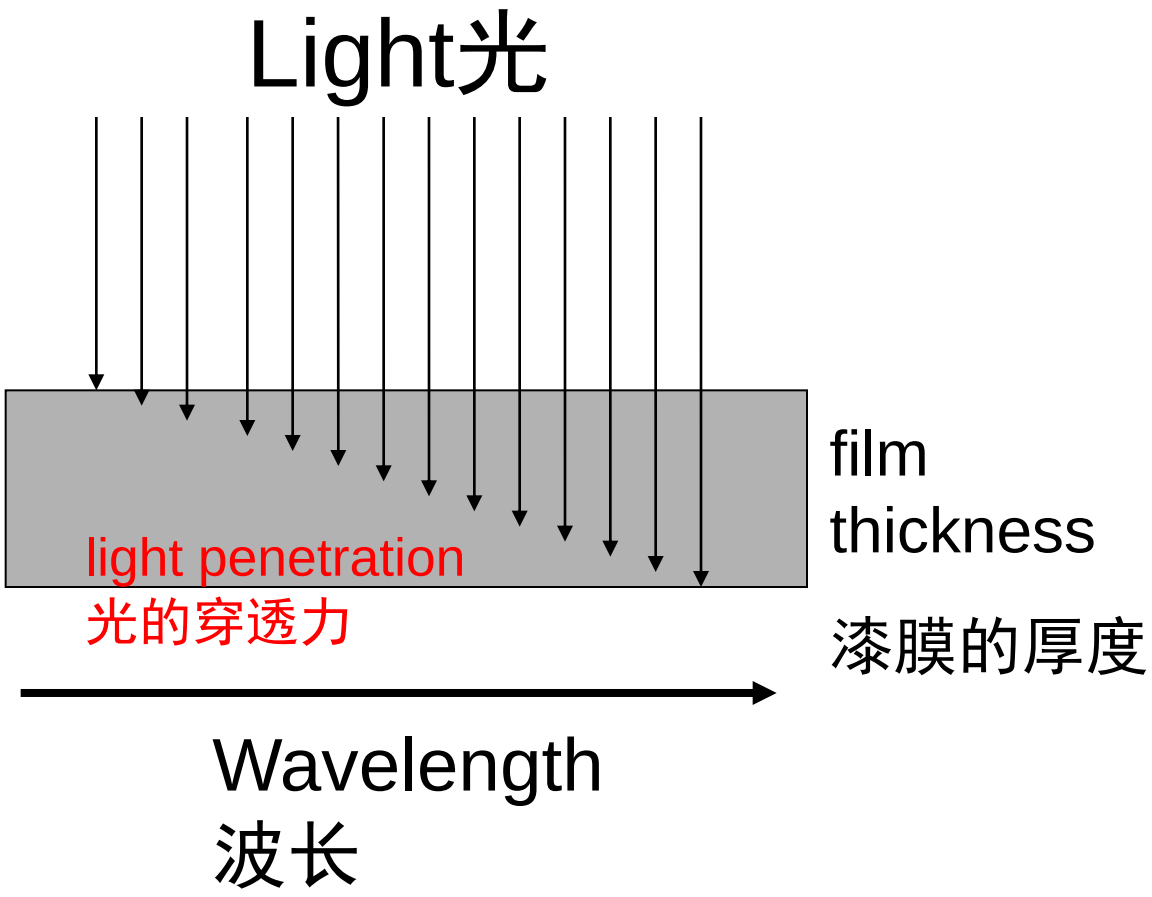
↓

Intensity: radiation efficiency / area mW/cm2
强度：辐射率 / 区域 毫瓦/平方厘米

↓

UV dosage: Intensity * radiation period mW*s/cm^2 = mJ/cm^2
UV能量：强度 * 辐射周期 毫瓦*秒/平方厘米=豪焦/平方厘米

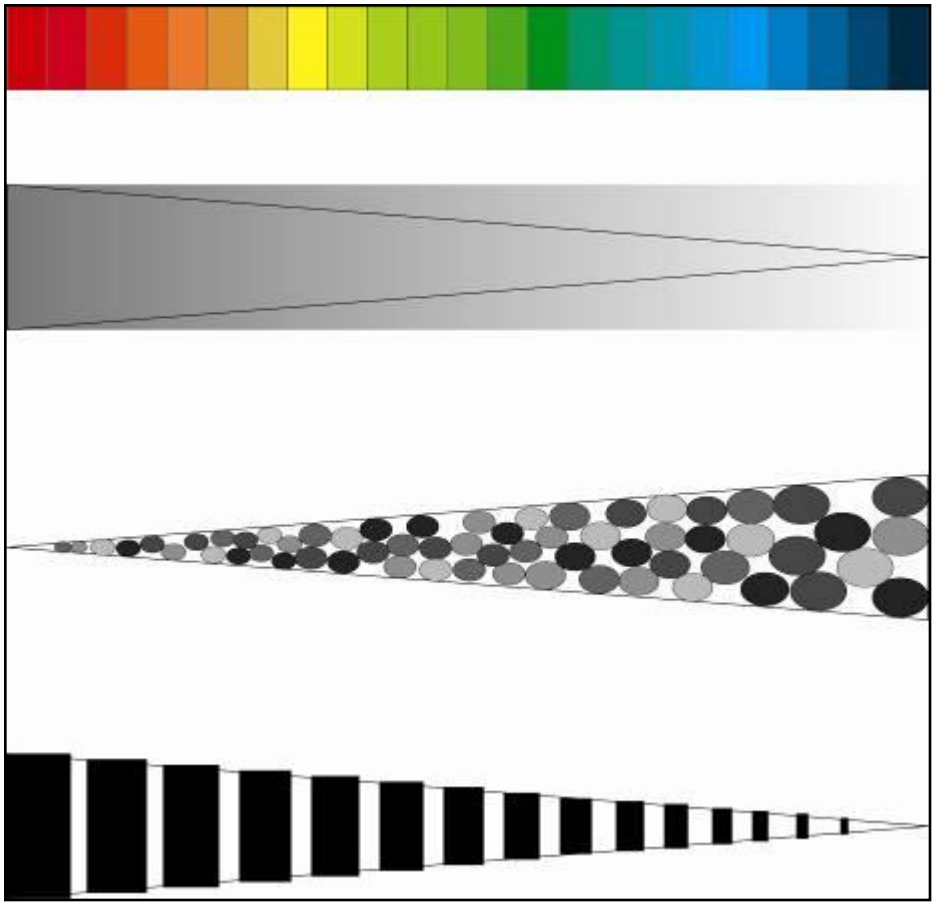
Principles of UV-technology
UV技术原理



Different paints require different Lamps
涂料不同，所使用的灯也有所不同

Principles of UV-technology
UV技术原理

Poor差 good良好 curing behaviour固化反应



Colour
颜色

Pigment concentration
颜料浓缩物

Particle size
颗粒尺寸

Film thickness
漆膜厚度

Principles of UV-technology
UV技术原理

UV product groups:
UV产品种类：

100% UV coatings: 100%UV涂料
no solvent or water included, solid content 100%
不含溶剂或水，固体含量100%

solvent-borne:溶剂型：
solvent is used to adjust viscosity and application behavior; could also be added on-site
溶剂用于调节粘度和喷涂特性；也可现场添加

water-borne:水性：
water is used instead of solvent, no oligomers usable水代替溶剂使用，不可使用低聚物

Principles of UV-technology
UV技术原理

Oxygen inhibition氧阻聚

What is oxygen inhibition?什么是氧阻聚?

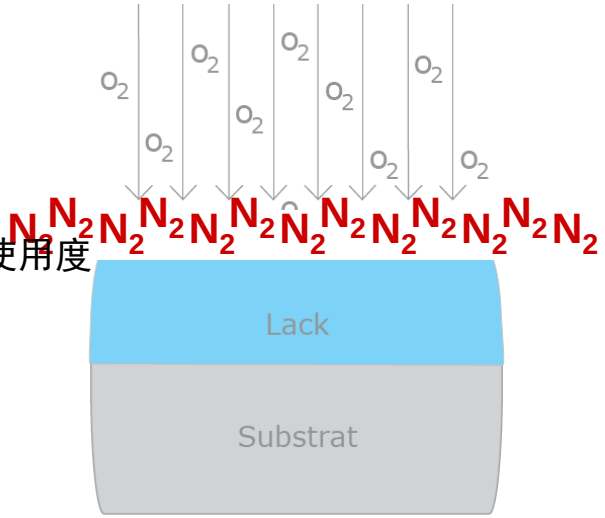
PI -> PI*

PI· + M -> PI-M·

PI-M· + M -> PI-(M)n·

PI-M· + O2 -> PI-M-O-OH

elimination of oxygen
by other gases
使用其他气体来降低氧气使用度



Principles of UV-technologyUV技术原理

Oxygen inhibition氧阻聚

How do we compensate oxygen inhibition:如何阻止氧阻聚：

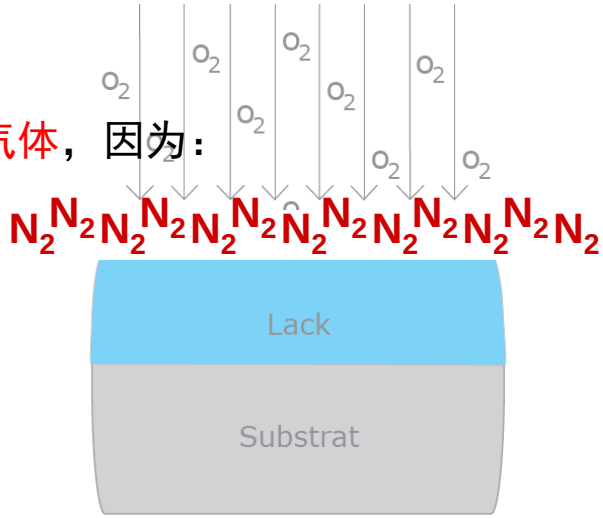
-> Increased concentration of photo initiators

-> 增加光引发剂的浓度

-> Increased UV intensity

-> 增强紫外线的强度

we do not use inertisation because of:我们不使用惰性气体，因为：



- complex and expensive equipment (gas supply)
- 设备（气体供应）复杂且价格不菲
- limitation in component size
- 限制产品尺寸
- limitation in dimensionality of components限制产品数量

but: - additional surface hardness achievable 但是：-可增加表面硬度

- cheaper formulation possible-降低配方成本

Principles of UV-technology UV技术原理

Dual-Cure / Monocure 双固化 / 纯UV固化

Acrylate + Photoinitiator
丙烯酸酯 + 光引发剂

UV-Light
UV光

Radical 激发 (Monocure) （纯UV固化)

ΔT;+ NCO / OH

Dual Cure System 双重固化系统

Monocure requires complete illumination of parts !
纯UV 固化需要对产品工件进行整体照射 !

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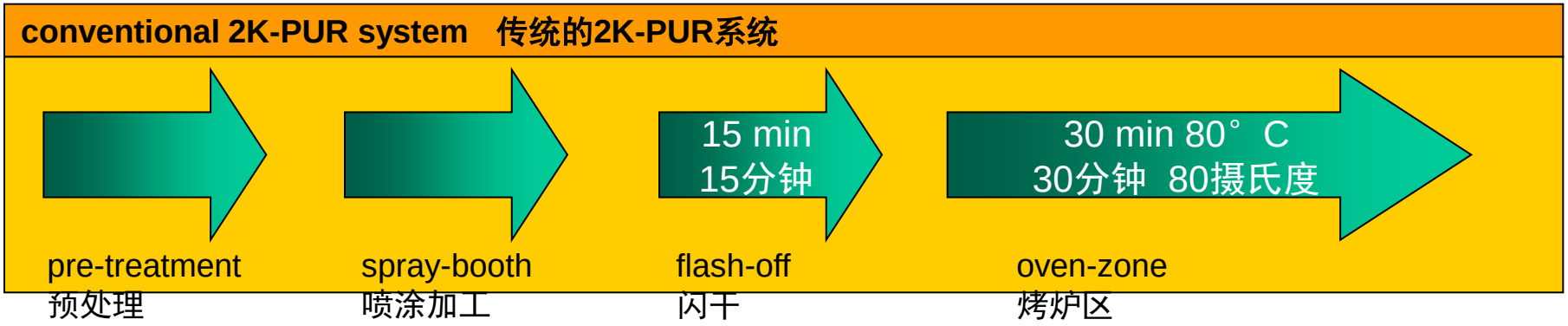
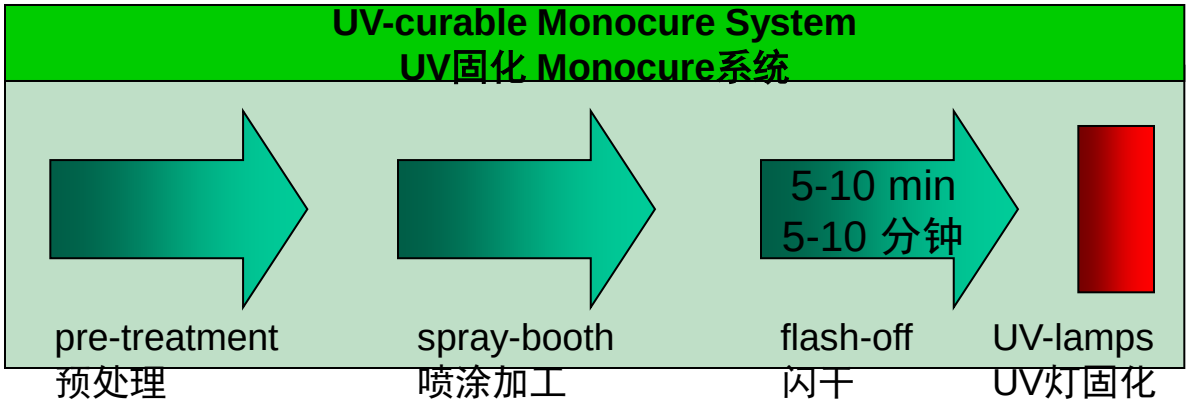
Mankiewicz UV-*Monocure*-Technology
创美凯威奇的纯UV固化技术

Properties **性能**	**Process advantage** **加工优势**	**Application** 应用
Curing within seconds 数秒之内固化	fast processing fast quality check 快速加工处理 快速质量检验	*highgloss Systems* *高光体系* ➢ low scrap rate ➢低报废率 ➢ high scratch resistance ➢良好的耐刮擦性 *short processing time* *缩短加工时间* ➢ high speed processes possible ➢可实现高速加工处理
no thermal drying necessary 不需要加热干燥	VOC + Energy saving 减少有机化合物挥发+ 节约能源	
high network density 高密度网状结构	high chemical and mechanical resistivity 较高的耐化学和机械性	

Mankiewicz UV-*Monocure*-Technology
创美凯威奇纯UV固化技术

Space and time requirements　空间和时间要求





- **shorter processing**
- **生产时间缩短**
- **low scrap rate**
- **低报废率**
- **immediate handling**
- **即时处理**

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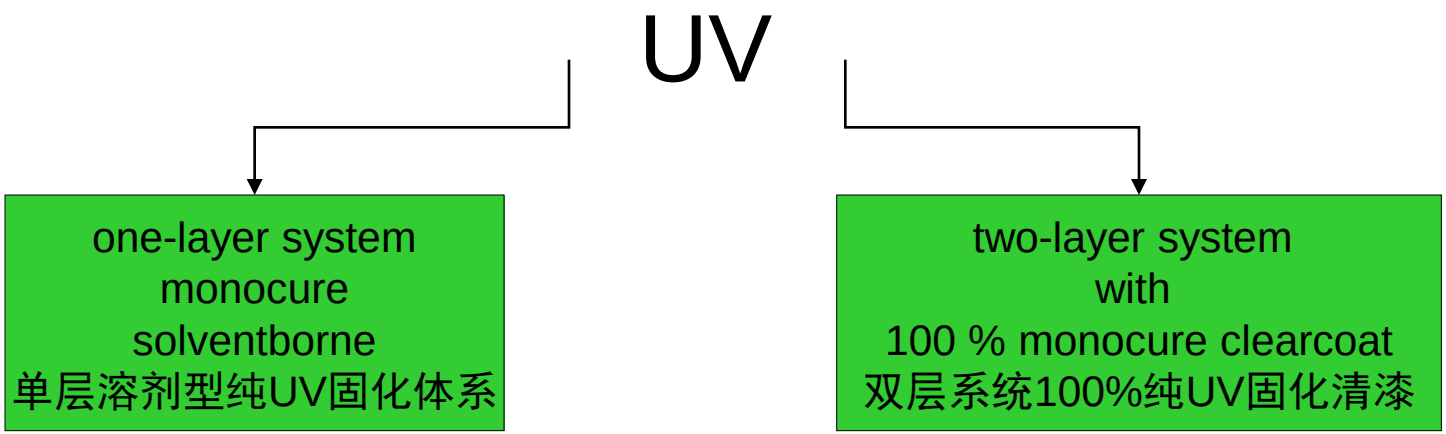
Mankiewicz UV-*Monocure*-Technology
创美凯威奇纯UV固化技术



- **Low scrap rates**
- **低报废率**

- **Quick processing**
- **快速加工**

- **No pot life**
- **无适用时效**

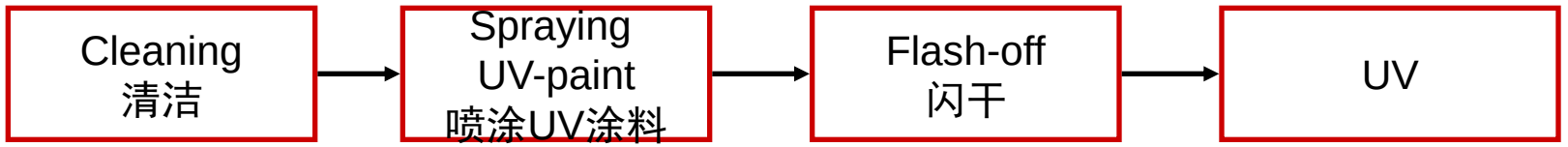
- **Easier colour matching**
- **色彩搭配更简单**

- **Metallics effects possible**
- **可达到金属效果**

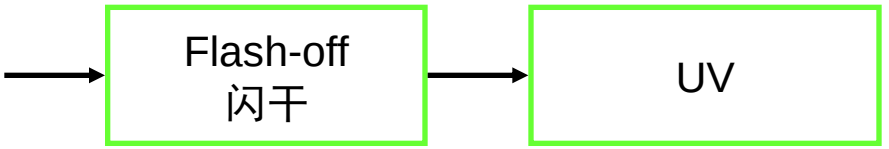
- **Laser etchable**
- **可激光镭雕**
- **No solvents**
- **无溶剂**

Mankiewicz UV-*Monocure*-Technology
创美凯威奇纯UV固化技术

Paint process: 喷漆流程：



Process parameter:
工艺参数：



Temperature温度
Time时间

Intensity强度
Dosage能量

Impact on coating performance?
对涂料性能的影响？

Mankiewicz UV-*Monocure*-Technology
创美凯威奇纯UV固化技术

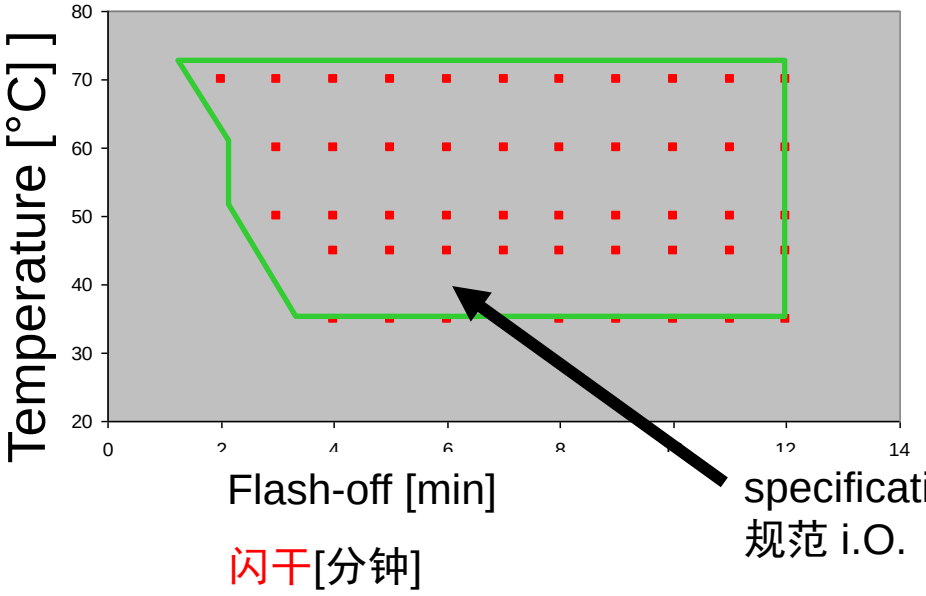
Example of application window (Cycon 757-10 Monolyer)
应用窗口示例(Cycon 757-10 Monolyer)

Variation of temperature and flash-off time: 温度和闪干的变化：

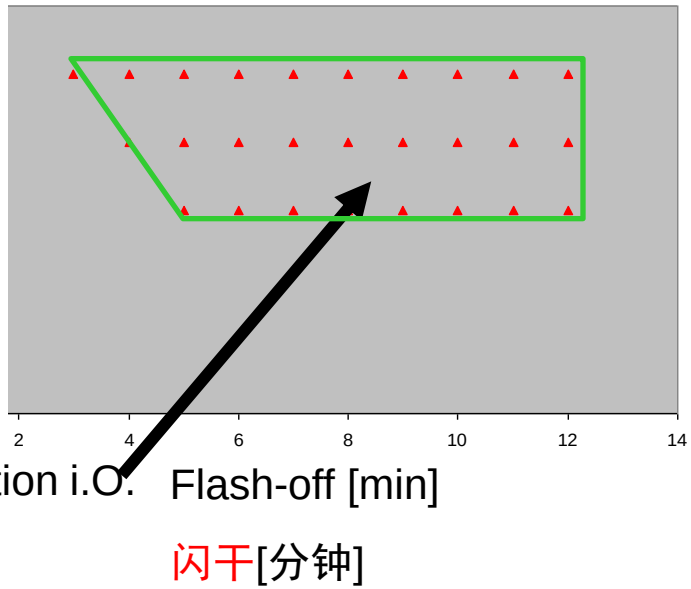
Temperature温度: 35° C – 70° C

Flash-off闪干: 1 min – 12 min 1分钟-12分钟

Film thickness 25 um 漆膜厚度25 um



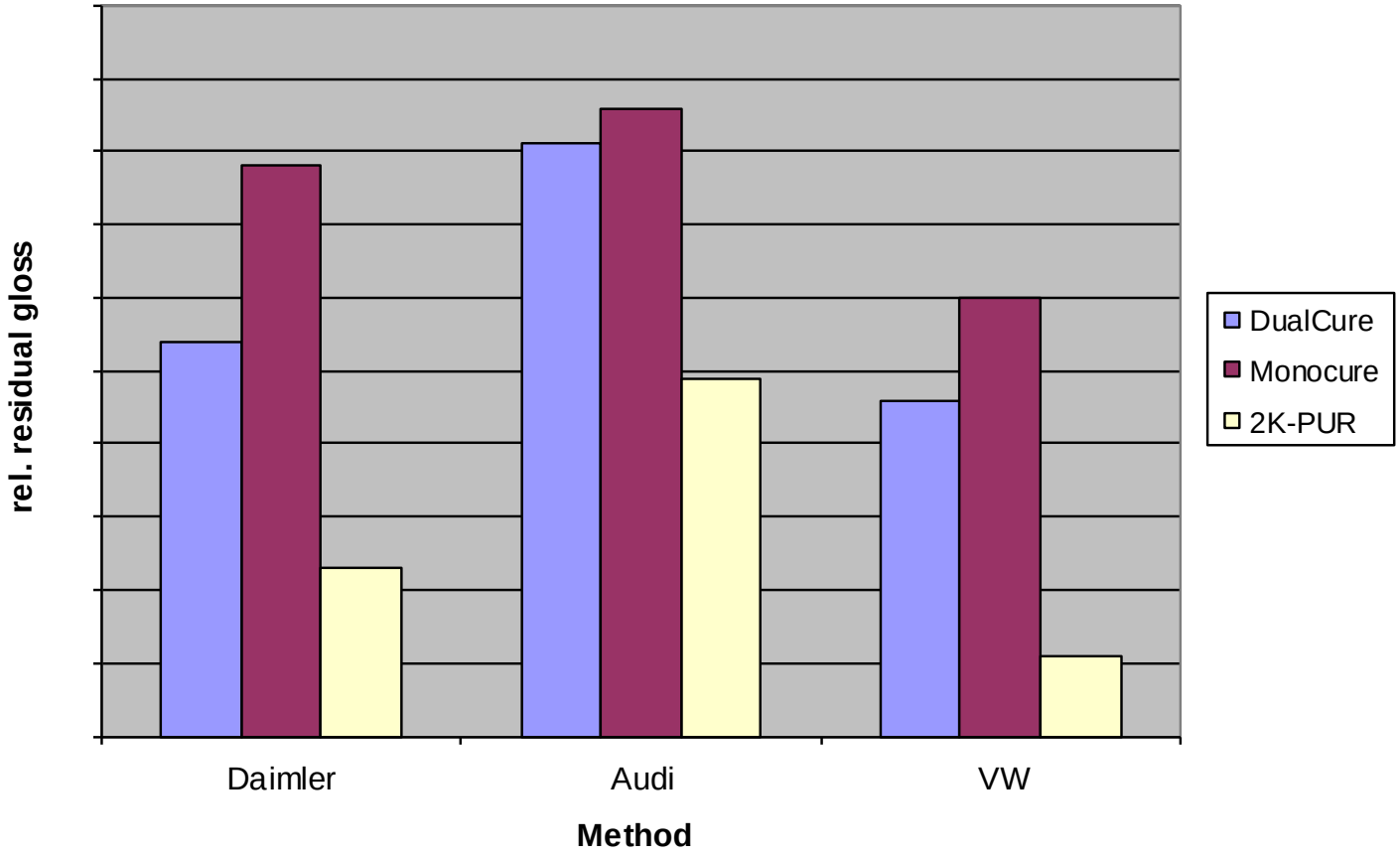
Film thickness 40 um 漆膜厚度 40 um



specification i.O.
规范 i.O.

Mankiewicz UV-*Monocure*-Technology
创美凯威奇纯UV固化技术

Scratch resistance of different technologies
不同技术的耐摩擦性



Mankiewicz UV-*Monocure*-Technology
创美凯威奇纯UV固化技术

Example for Martindale performance (PV3975)

马丁代尔（Martindale)性能举例（PV3975)

Coating 涂料	Residual Gloss 残留光泽
463-57 / 757-11	91 %

results ok acc. to VW spec. (TL226)
根据VWTL226标准，测试结果合格。

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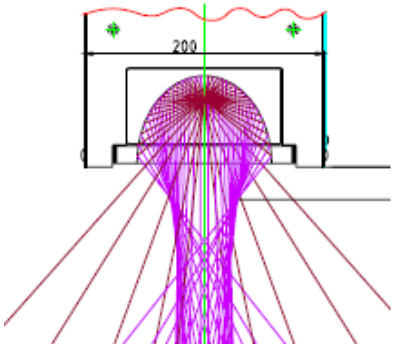
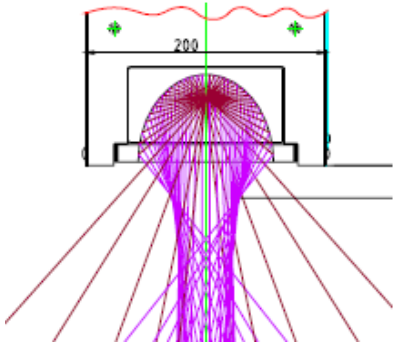
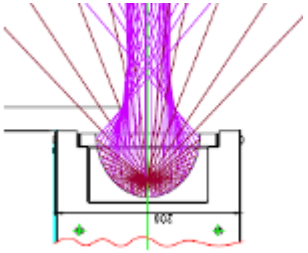


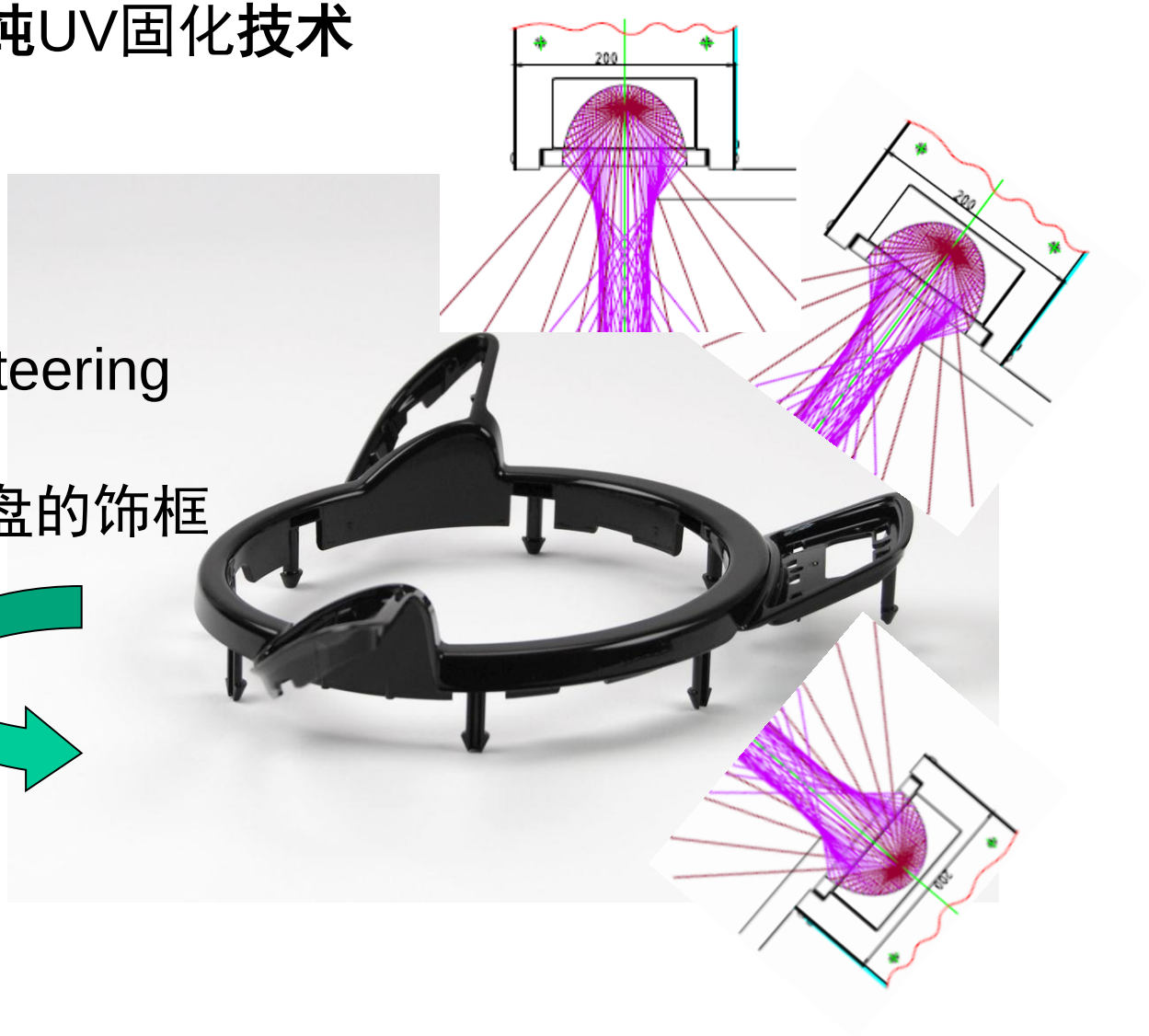
Interior trims
内装饰件





Mankiewicz UV-*Monocure*-Technology
创美凯威奇纯UV固化技术

Ring for steering Wheel
用于方向盘的饰框



Mankiewicz UV-*Monocure*-Technology
创美凯威奇纯UV固化**技术**






Mankiewicz UV-*Monocure*-Technology
创美凯威奇纯UV固化**技术**

OEM approvals　OEM 批准

OEM	**Paint system　涂料系统**	**Status　状态**
Audi	757-10	Approved　已批准
	463-60 + 757-11	Approved已批准
Landrover	757-10	approved已批准
	463-60 + 757-11	not requested 无要求
Ford	757-10	approved已批准
	463-60 + 757-11	approved已批准
BMW	757-10	approved已批准
	463-60 + 757-11	not requested 无要求
Opel	757-10	approved已批准
	463-60 + 757-11	not requested无要求
VW	757-10	approved已批准
	463-60	Approved已批准
PSA	757-10	approved已批准
	463-60 + 757-11	approved已批准

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UV-Monocure: Application on plastics exterior
UV纯固化技术: 应用于塑料外饰产品

Transferable for exterior paints? 可转换应用于外饰涂料?

-Resistance of binder?

-粘合剂的耐性?

- Yellowing due to photoinitiators?

-光引发剂导致泛黄?

- Absorber competes with photoinitiators for light?

-吸收剂与光引发剂争夺光源?

- ……

UV-Monocure: Application on plastics exterior
UV纯固化技术: 应用于塑料外饰产品

UV Exterior Coating from Mankiewicz

创美凯威奇推出的UV外用涂料

PSA B720200	**Results 结果**
High Pressure cleaning (Kärcher) 高压清洗(Kärcher)	Ok 合格
Stone Impact 石击实验	Ok 合格
Immersion in Water (240h 40° C)水浴实验（24 小时 40摄氏度）	Ok 合格
Exposure to Light 自然暴晒	Ok 合格

complies PSA, GM etc.
符合PSA,GM 标准

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UV-Monocure: UV-on-metal
UV-Monocure:作用于金属的UV

Requirements 要求

- 1C UV Monocure → high reactivity
- 1C UV Monocure →高反应性

- one layer → corrosion protection
- 单层 →防腐蚀保护

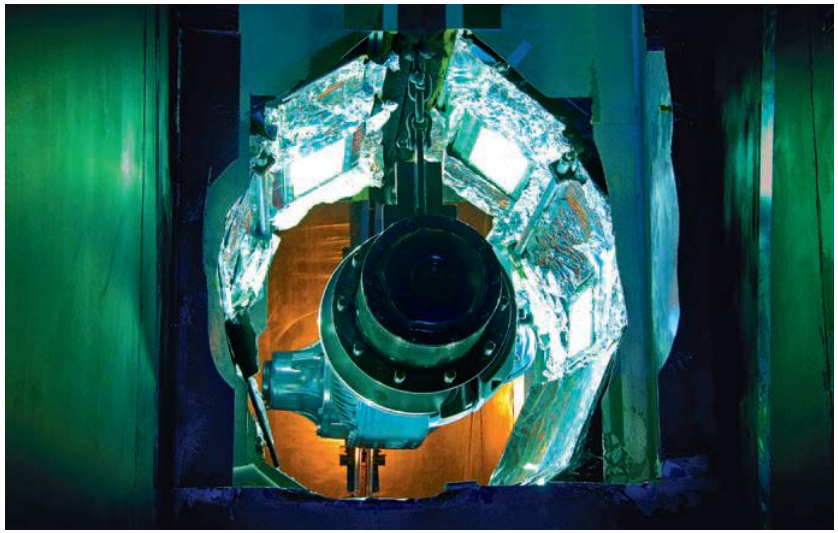
- pigmented → grey, black
- 着色 →灰、黑
  → 160µm DFT

- no VOC → 100% system
- 不含挥发性有机化合物→ 100%系统

- metal substrates → adhesion
- 金属基材 → 附着性
  → flexibility灵活性

UV-Monocure: UV-on-metal
UV-Monocure:作用于金属的UV

Specification　标准



- initial adhesion ✓初始附着力
- salt fog resistance ✓耐盐雾性
- condensation atm. ✓大气冷凝
- chemical resistance ✓耐化学性
- multi stone impact ✓多次石块撞击

Thanks For Your Attention!

谢谢！