



THE EXPERIENCE

• CONVENTION AND TRADE SHOW •

SEPTEMBER 9–11
2026 PARIS LAS VEGAS





Material Science & Chemical Compatibility:

Back to Basics

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Founder, Immaculate Collective

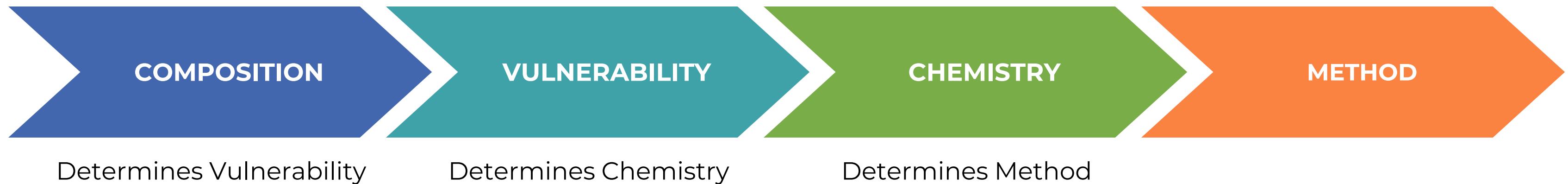


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The Composition Chain



PART ONE. STRUCTURE

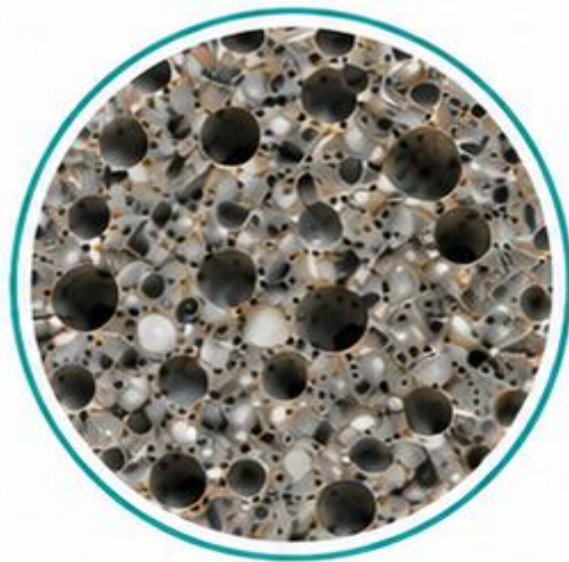


The Material Structure Spectrum

CAPILLARY OPEN



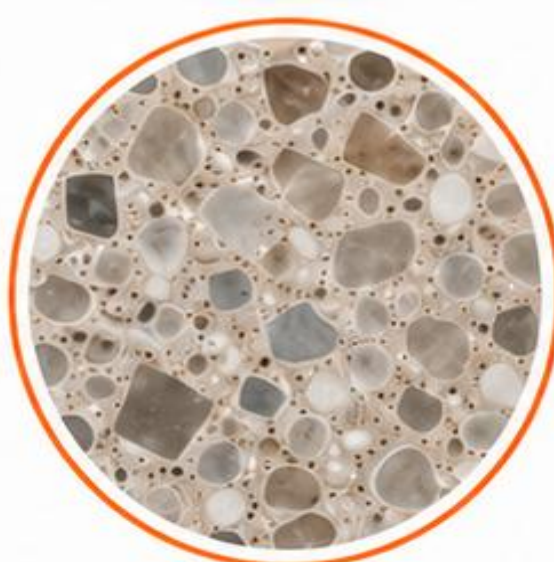
ACTIVE PORE NETWORK



LAYERED SYSTEMS



DENSE MATRIX

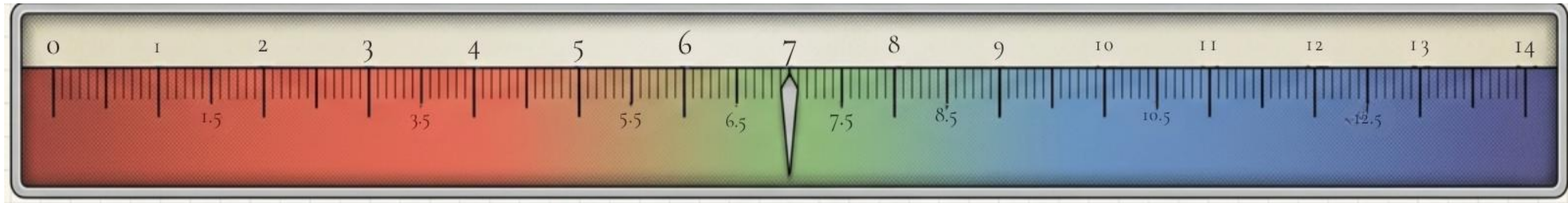


VITREOUS / CRYSTALLINE



PART TWO. CHEMISTRY

The pH Threat Scale



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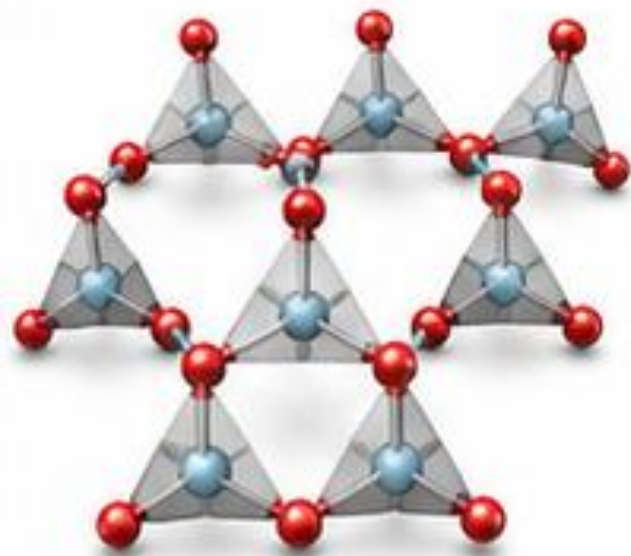
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PART TWO. CHEMISTRY

Bond Stability by pH



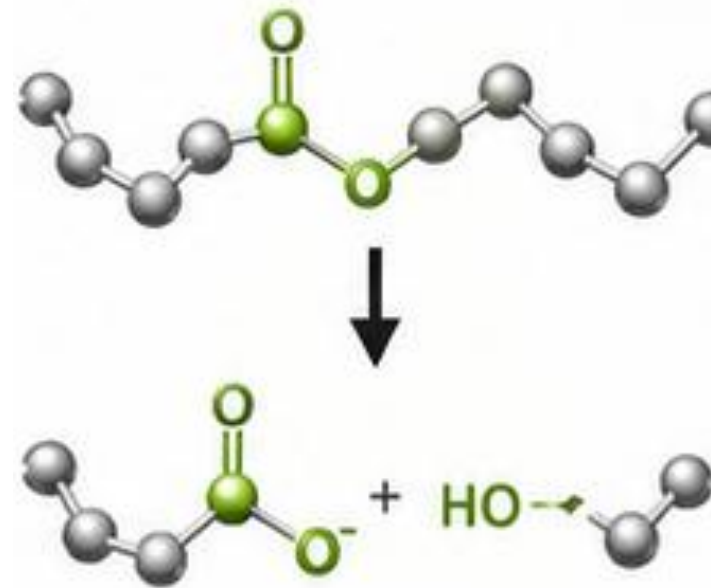
1 SILICA-OXYGEN
BONDS



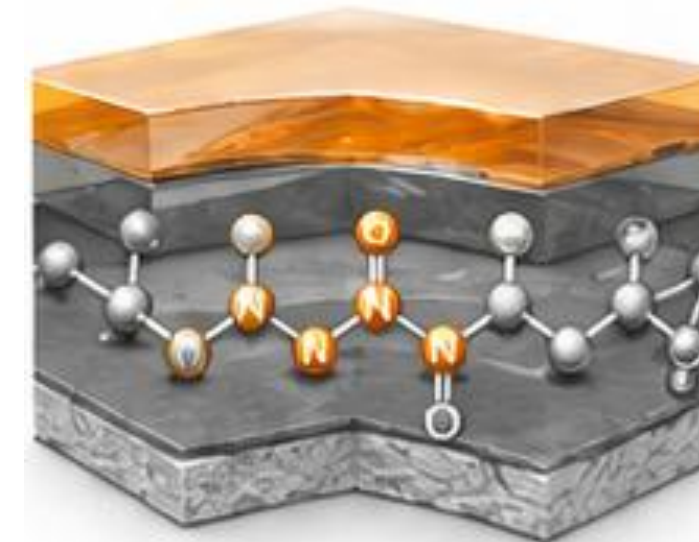
2 CARBONATE
BONDS



3 ESTER
BONDS



4 URETHANE
BONDS



5 AMIDE
BONDS



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PART TWO. CHEMISTRY



What the Chemistry Actually Does



Read The Mechanism, Not The Marketing Label.



PART TWO. CHEMISTRY

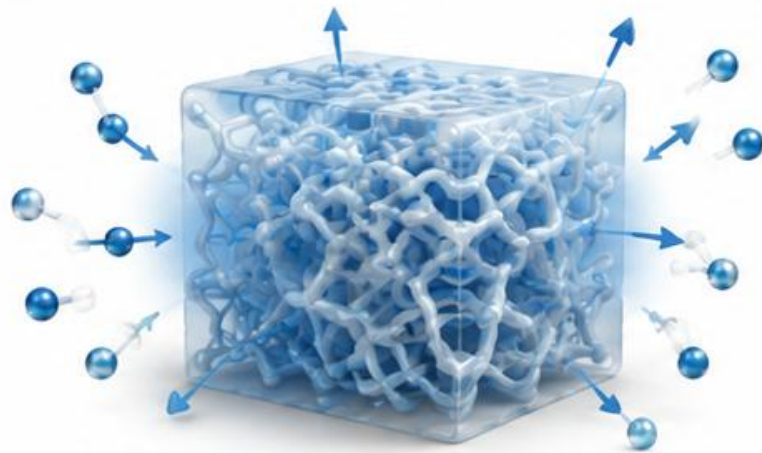


Polymer Failure Pathways

1

SOLVENT SWELLING

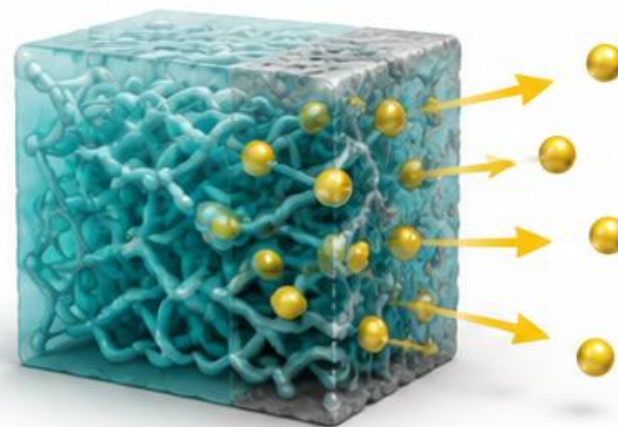
Compatible solvents slide between the chains and pry the polymer open. It may swell, soften, go tacky, or lose strength.



2

PLASTICIZER MIGRATION

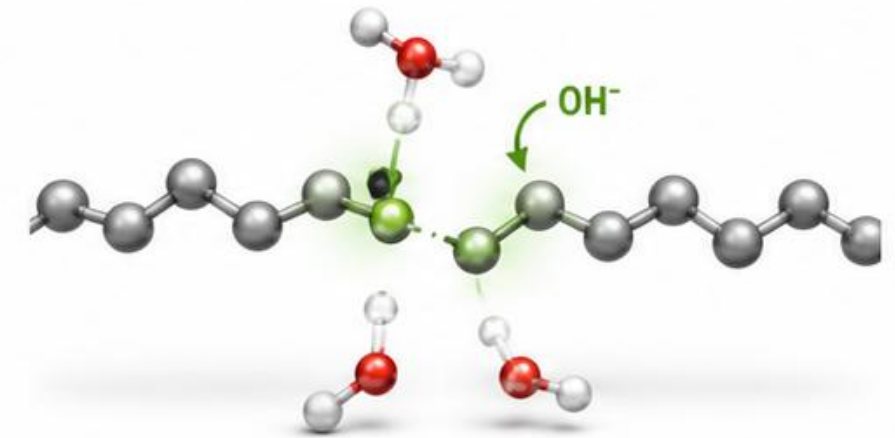
Specific surfactants and solvents can pull plasticizers out of flexible polymers. The material may stiffen, shrink, or go tacky.



3

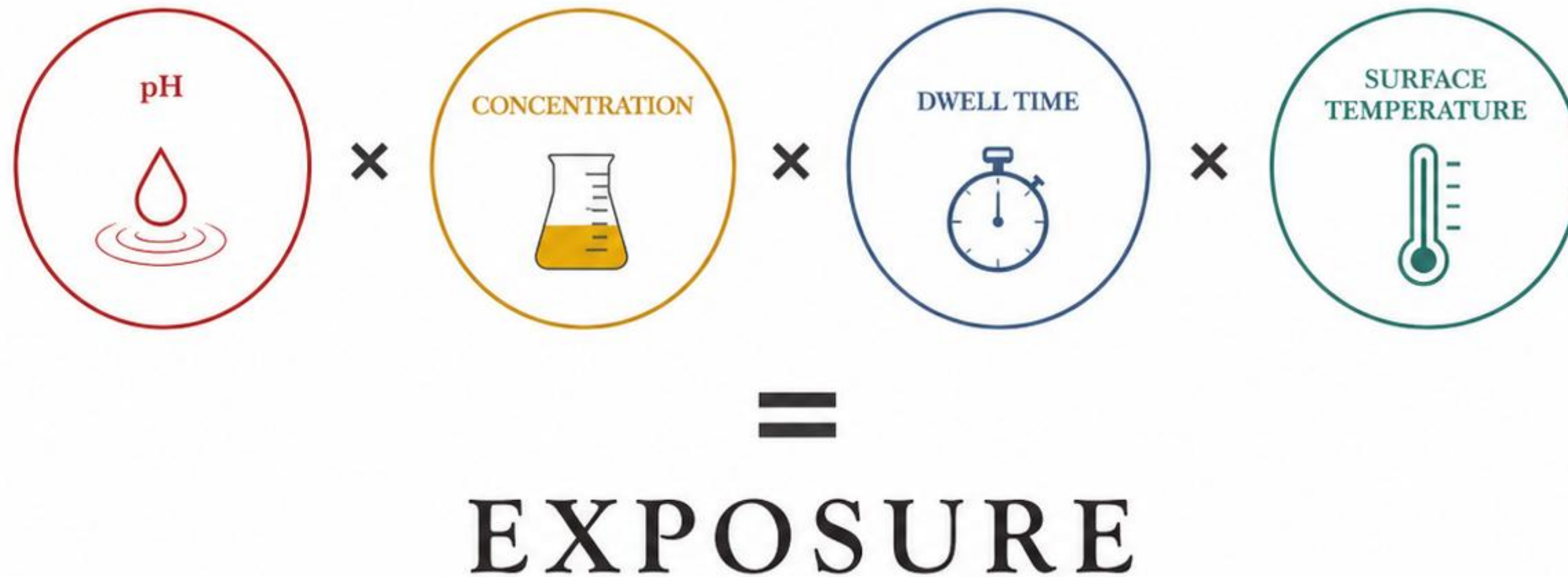
HYDROLYSIS

Water and PH break susceptible linkages in the chain. Strength, cohesion, and gloss go first.





The Four Compatibility Levers



————— *They do not add.* —————
They multiply.



PART TWO. CHEMISTRY

Bond To Material Map



BOND (WHAT BREAKS IT)	MATERIALS THAT CARRY IT			
SILICA-OXYGEN Very high pH only (11–12+) $\text{Si}-\text{O}-\text{Si}$	Quartz 	Porcelain Body 	Glass 	Glaze 
CALCIUM CARBONATE Acid $\text{O}=\text{C}(\text{O}^-)_2$	Marble 	Limestone 	Travertine 	Onyx 
ESTER Alkaline $\text{R}-\text{O}-\text{C}(=\text{O})-\text{R}$	Engineered Quartz Resin 	Polyester Fiber 	Some Coatings 	Some Adhesives 
URETHANE Alkaline $\text{R}-\text{O}-\text{C}(=\text{O})-\text{NH}-\text{R}$	Floor Finishes 	LVP Wear Layers 		
AMIDE Alkaline (Wool, Silk) / Acid (Nylon) $\text{R}-\text{C}(=\text{O})-\text{NH}-\text{R}$	Wool 	Silk 	Nylon 	



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Natural Stone. Carbonate Versus Silicate

CALCAREOUS

Marble, Limestone, Travertine, Onyx



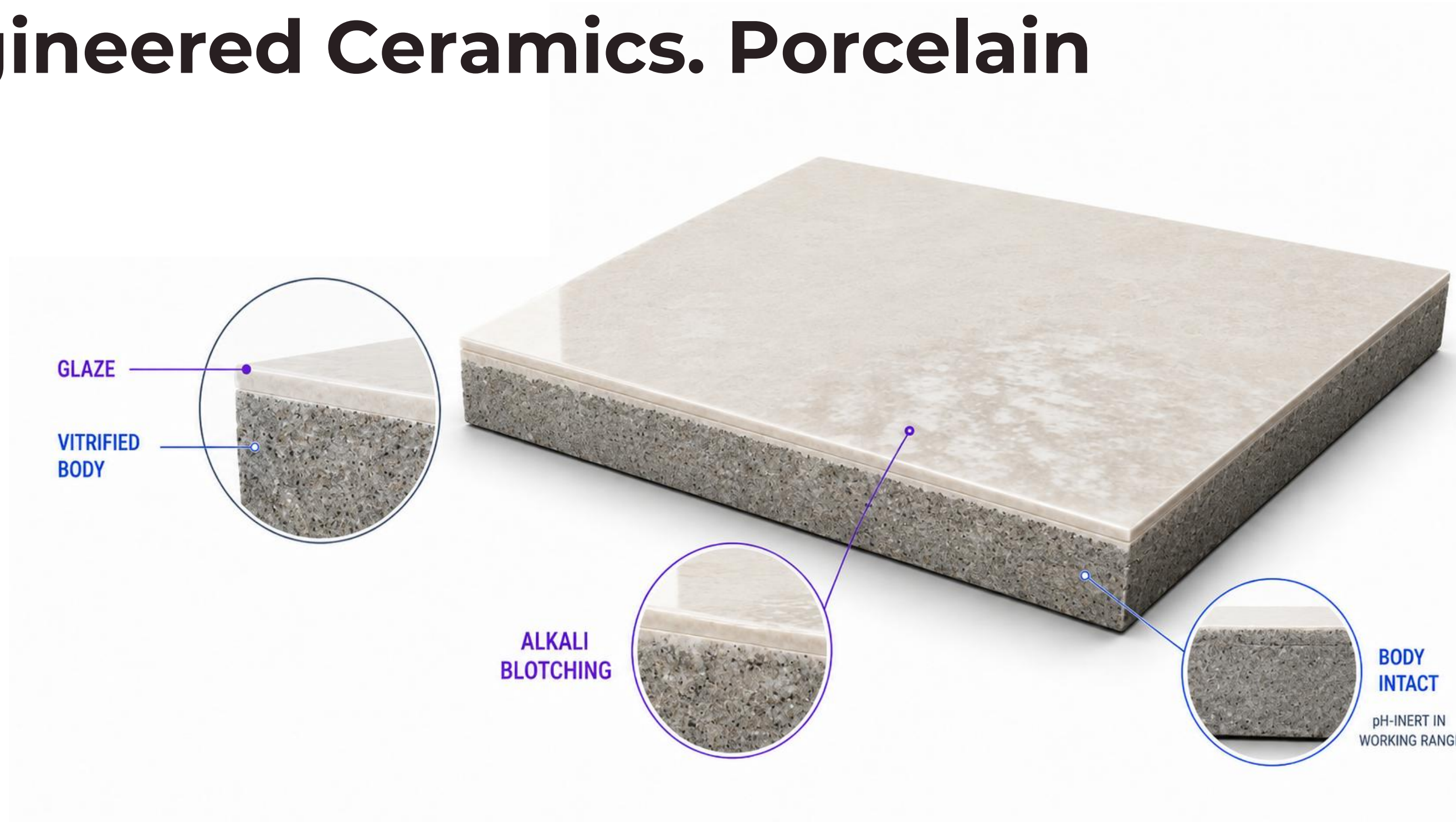
SILICEOUS

Granite, Quartzite, Slate



PART THREE. MATERIAL SYSTEMS

Engineered Ceramics. Porcelain



PART THREE. MATERIAL SYSTEMS

Engineered Composites



DURABLE AGGREGATE



VULNERABLE BINDER

ENGINEERED QUARTZ



SOLID SURFACE

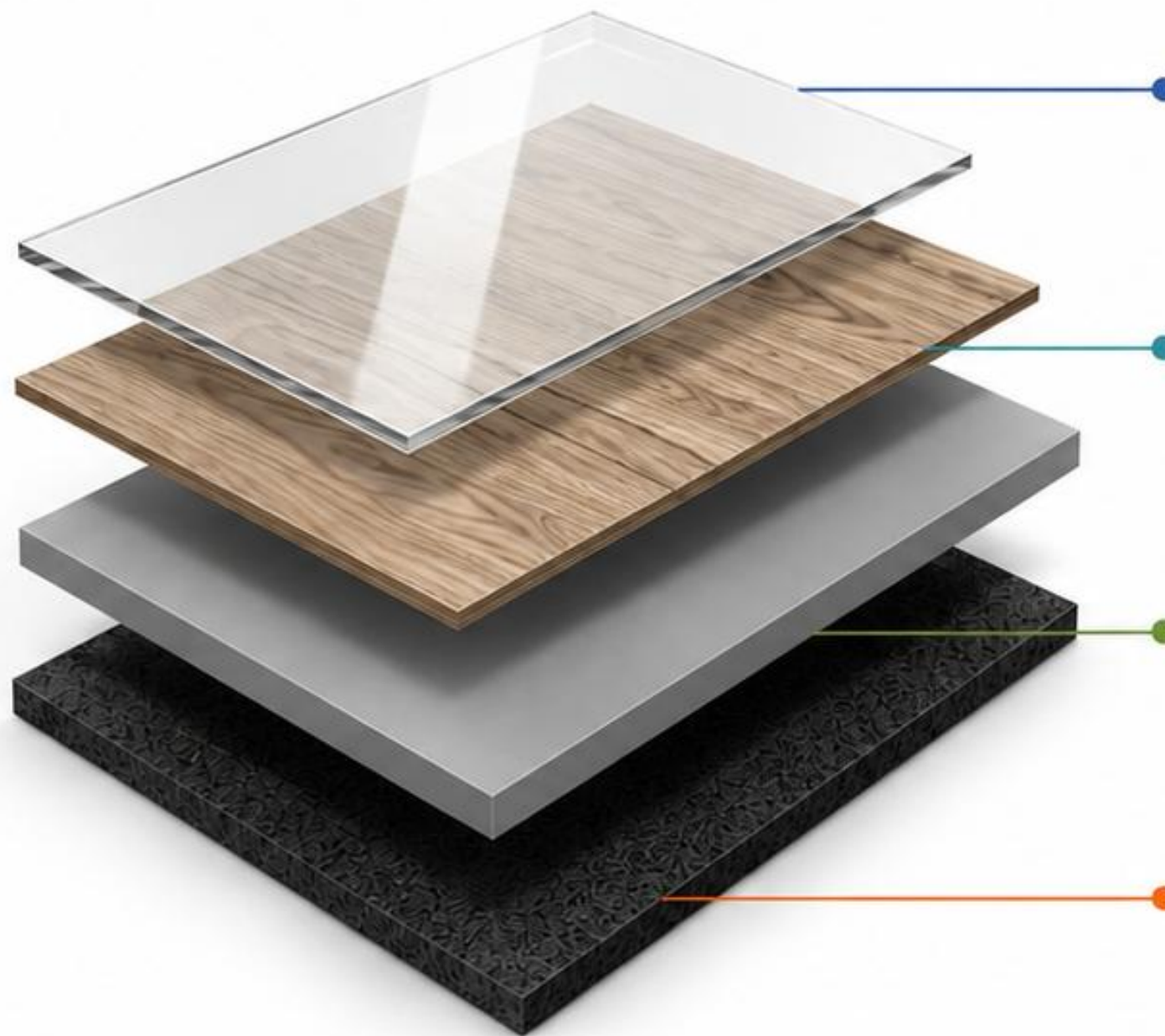


The Binder Sets The Chemical Limit.



PART THREE. MATERIAL SYSTEMS

LVP and Layered Systems



1. WEAR COAT (URETHANE)

Urethane with aluminum oxide.
Scratch resistance. Chemical interaction happens here. Hydrolyzes in alkalinity.



2. PRINT FILM

Decorative layer.
Damage shows as discoloration or pattern loss.



3. CORE (PVC / SPC / WPC)

Holds the structure. Contains plasticizers.
Surfactants pull plasticizers out from below.



4. BACKING (FOAM / CORK)

Absorbs moisture from the subfloor.
Moisture has nowhere to go.



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PART THREE. MATERIAL SYSTEMS



Wood. Solid and Engineered



Solid Wood

Build: Continuous Wood Structure
Response: Swelling, Cupping, Finish Stress



Engineered Wood

Build: Hardwood Face Bonded To Core
Response: Edge Swell, Delamination, Finish Stress

Moisture Drives The Movement.



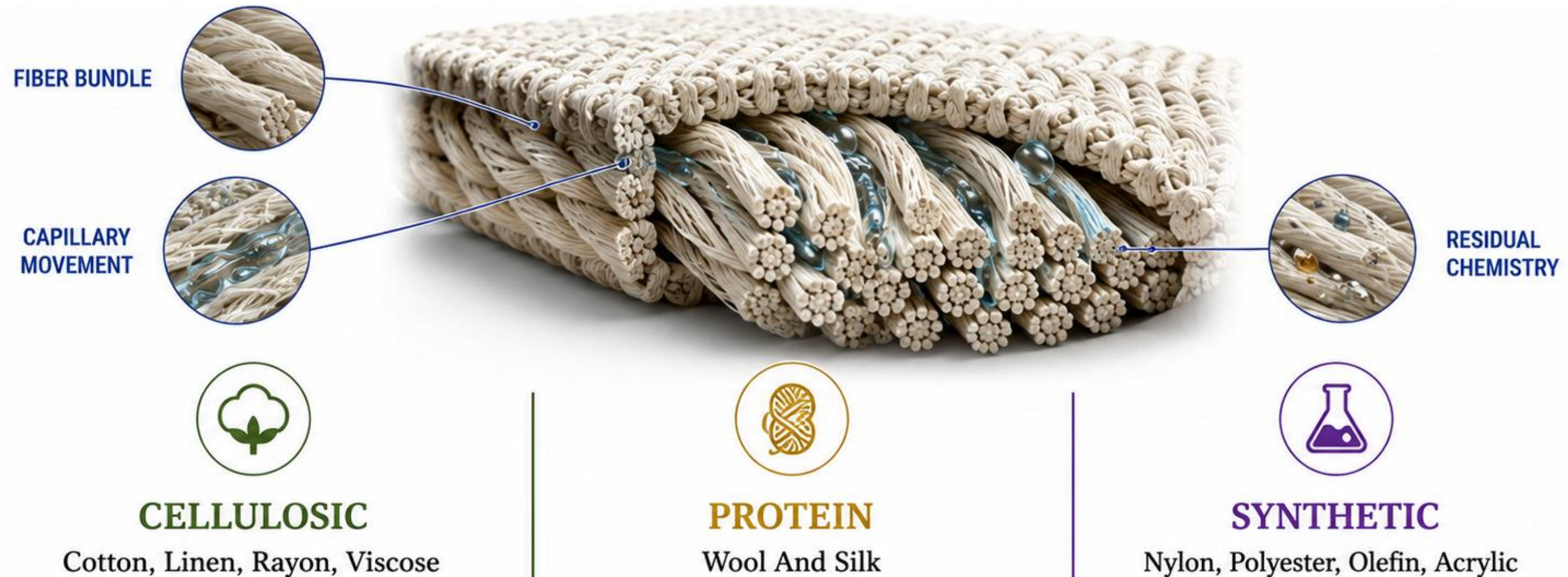
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PART THREE. MATERIAL SYSTEMS



Textiles. Fibers and Capillarity



Capillarity Pulls Chemistry Into The Fiber Bundle.



PART FOUR. METHOD



Hardness Determines Mechanical Limits

Mohs Scale

Scratch Hardness For Minerals



Vickers / Knoop

Microhardness For Glazes and Coatings



Match the Hardness Scale to the Surface Layer You Are Testing.



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PART FIVE. VAPOR



Vapor Pressure and Vapor Movement

VAPOR PRESSURE

What Leaves The Surface

HIGHER VAPOR PRESSURE

Liquid carrier leaves faster.

LOWER VAPOR PRESSURE

Liquid carrier stays longer.



As vapor leaves, nonvolatile chemistry remains and becomes more concentrated.

VAPOR MOVEMENT

Where Moisture Goes After It Enters

DIFFUSION

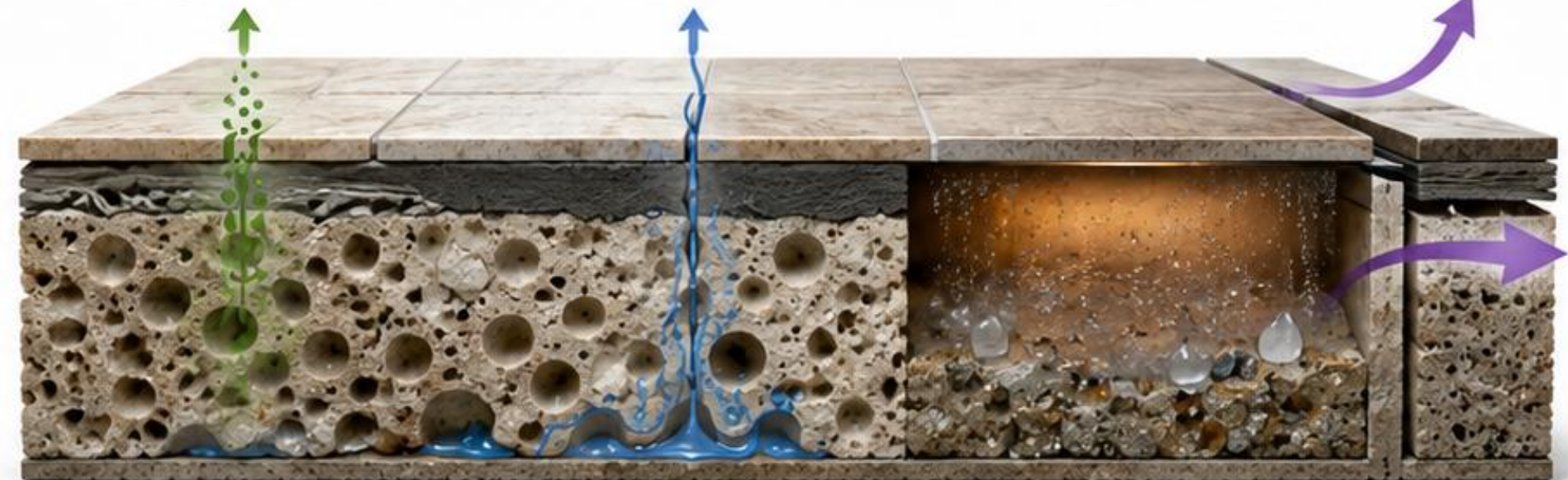
Molecules move through the structure.

CAPILLARY

Moisture moves through pores.

AIR MOVEMENT

Moisture is pulled through openings and pressure paths.



ESCAPE PATH

Moisture can exit when a path is open.

TRAPPED MOISTURE

Closed or layered surfaces block escape. Moisture accumulates and causes damage.

Chemistry leaves the surface. Moisture travels inside the material.



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PART SIX. VERIFY



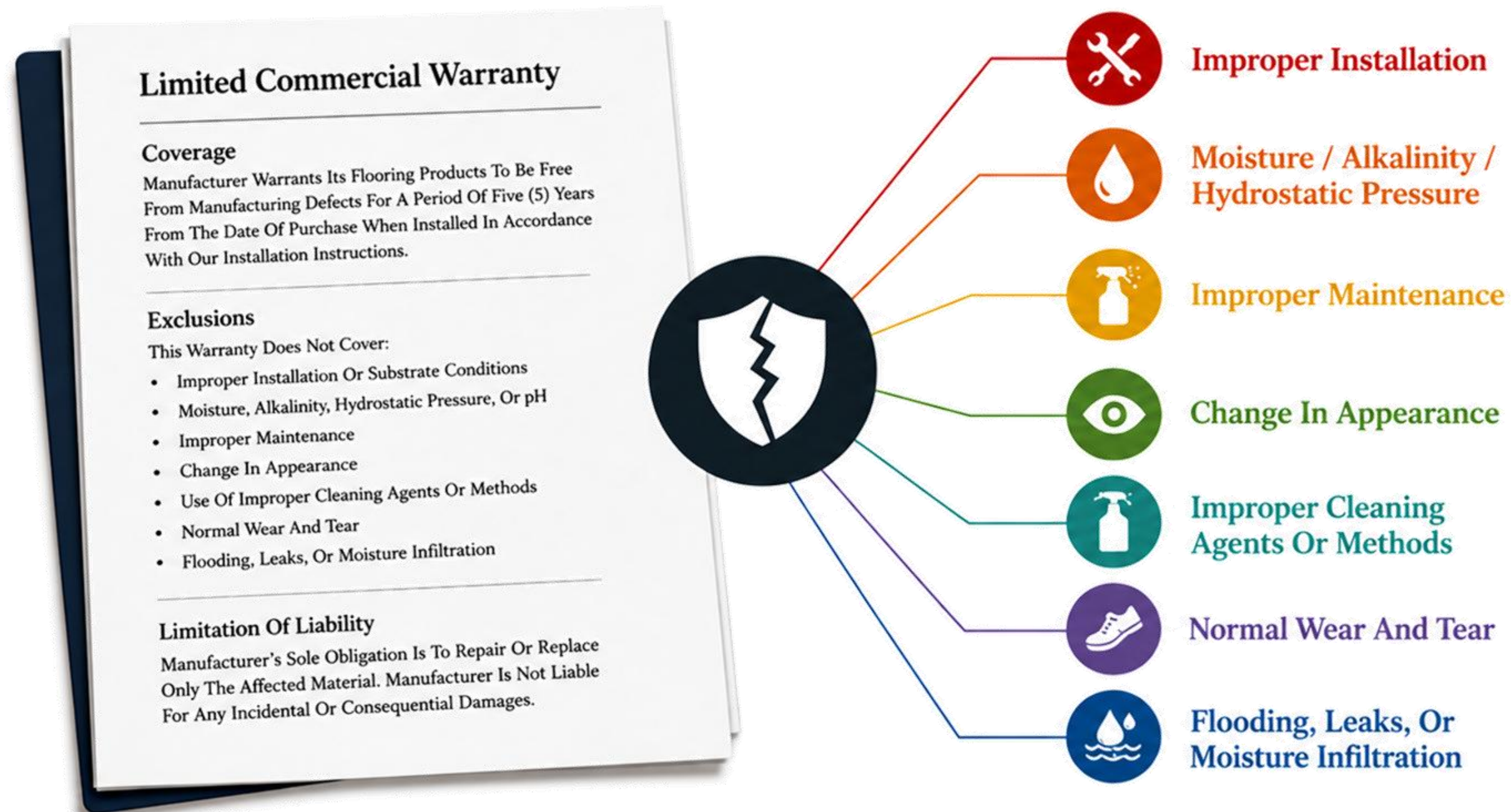
Verification by Trajectory, Not Snapshot



PART SEVEN. WARRANTY



Warranty Language as Vulnerability Map



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FINAL FRAMEWORK

Read Both Axes, Every Time



STRUCTURE

How Chemistry Moves



BOND CHEMISTRY

Whether The Material Survives

COMPOSITION



VULNERABILITY



CHEMISTRY



METHOD



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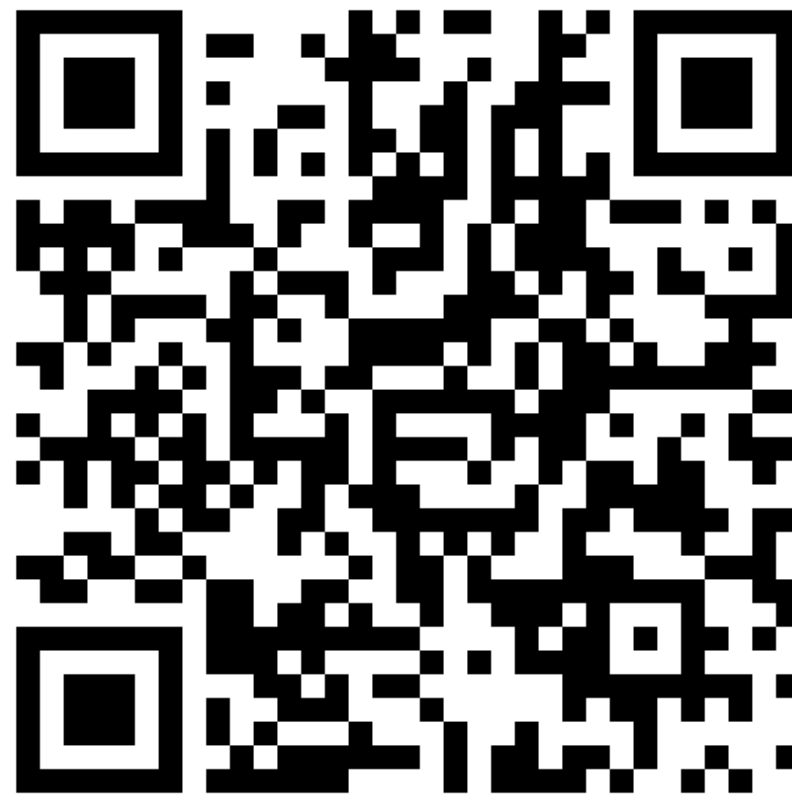
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