

luxexecutivesummit 2018

Amsterdam • June 6-7

New Technologies for Old Markets

Informatics and Multi-material Bonding in Adhesives | June 7th, 2018

Presenter: Cecilia Gee, Research Associate, Lux Research



The adhesives landscape is mature but comes with opportunity

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**Adhesives are embedded
in every major market**

Construction

Furniture

Packaging

Industrial

Automotive

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**Adhesives offer
high global value**

€40 billion

16 million tons

Pressures push companies to strategize and innovate – often with limited resources

Capex/Opex

Driven to maintain efficiency

Must cut down costs wherever possible

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Feedstock Volatility

Planned and unplanned issues with isocyanate production

Jumps in price for raw materials

Low operating margins

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Performance

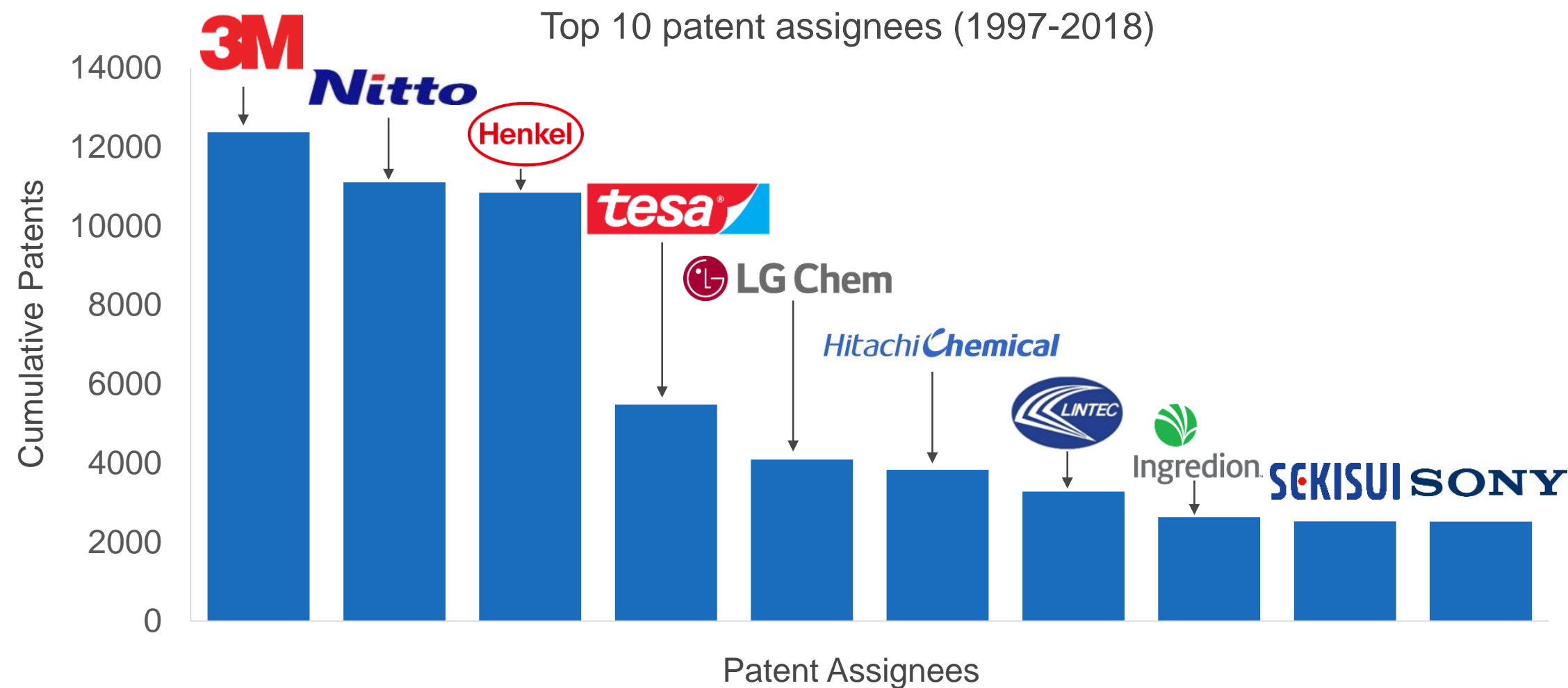
Adhesives must do more than just bond

Increase in performance reliability

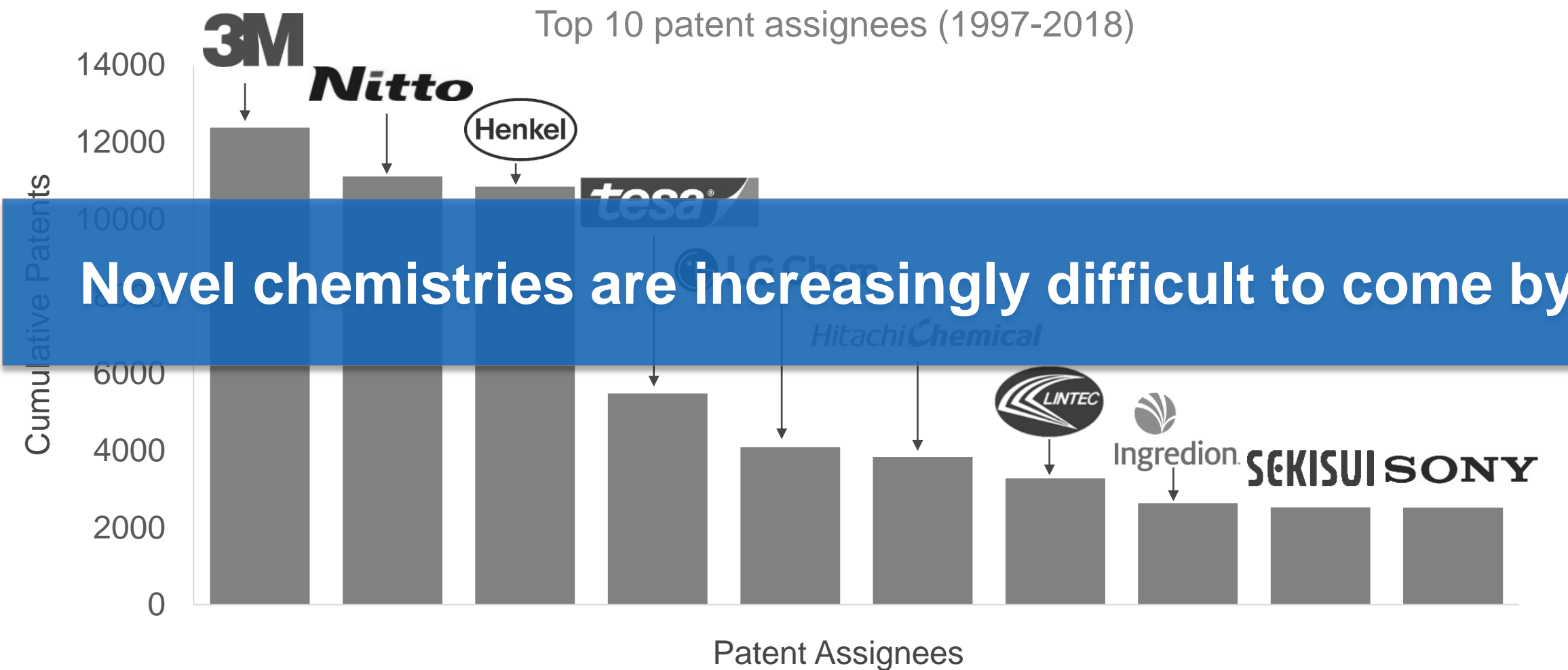
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Capex/Opex	Feedstock Volatility	Performance	Regulation
<p>Driven to maintain efficiency</p> <p>Must cut down costs wherever possible</p>	<p>Planned and unplanned issues with isocyanate production</p> <p>Jumps in price for raw materials</p> <p>Low operating margins</p>	<p>Adhesives must do more than just bond</p> <p>Increase in performance reliability</p>	<p>Health and safety concerns</p> <p>Toxicity constraints</p> <p>Air pollution concerns</p>

Adhesives patent activity is dominated by major corporations



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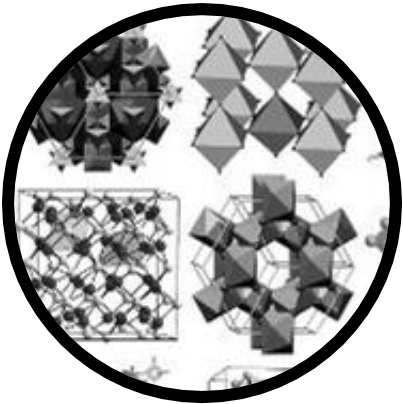


**How can you
rise above this
challenging
landscape?**

Emerging technologies can meet present and future challenges



A toolbox for adhesives innovation



**Materials
informatics**



**Multi-material
adhesives**



**Bio-based
adhesives**



Robotics

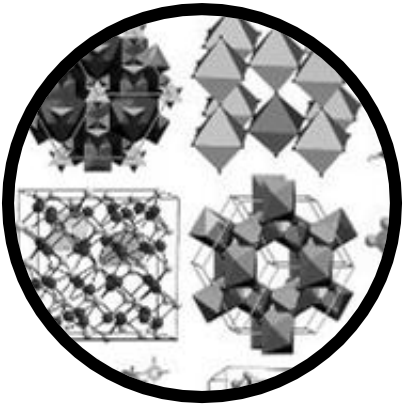


**Reversible
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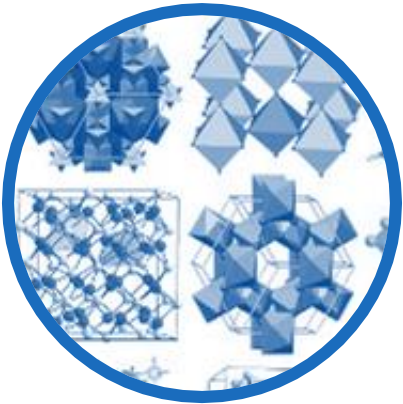


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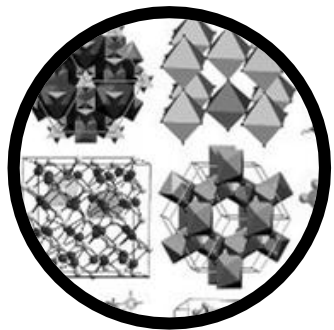
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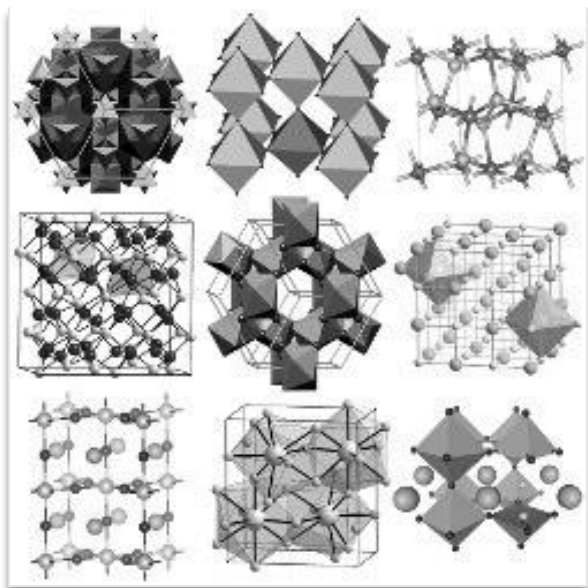
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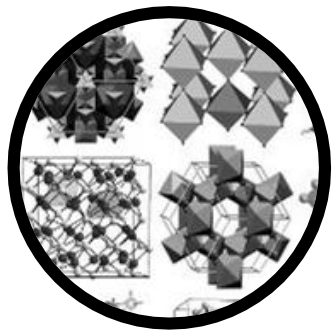


Materials Informatics

Rapidly accelerating the process of R&D

DISCOVERY

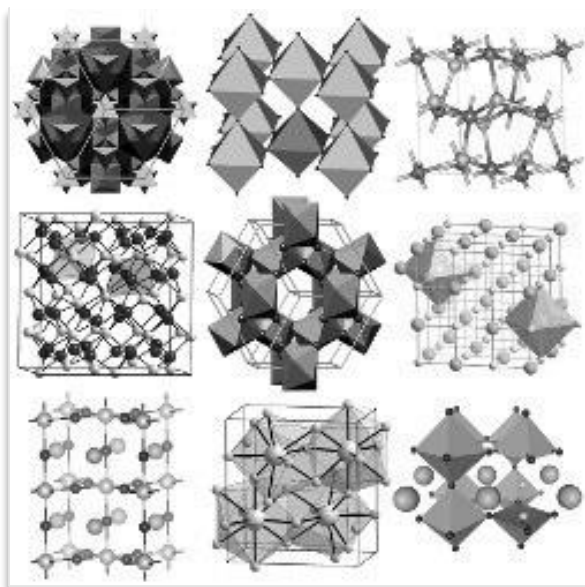




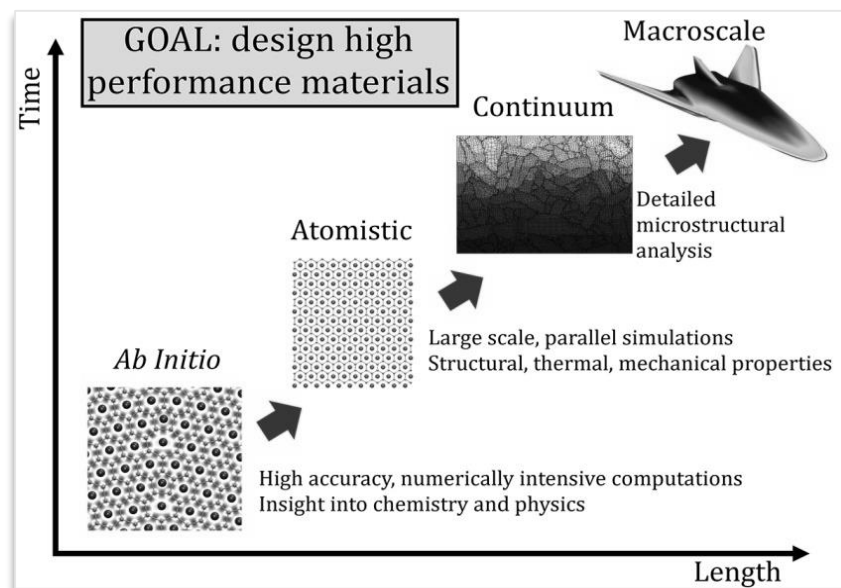
Materials Informatics

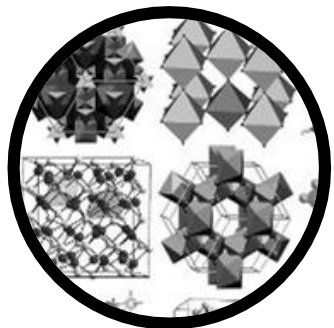
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DISCOVERY



OPTIMIZATION

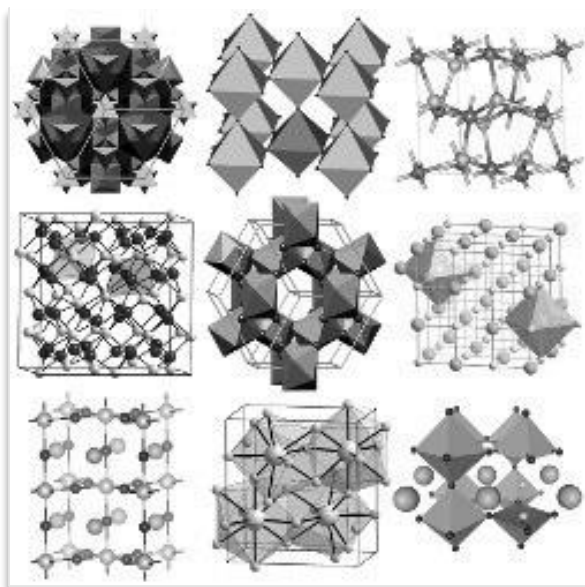




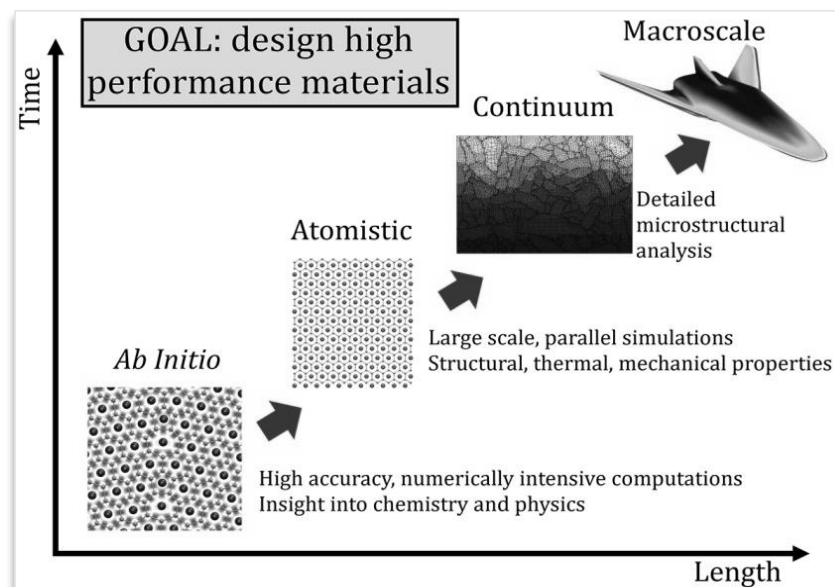
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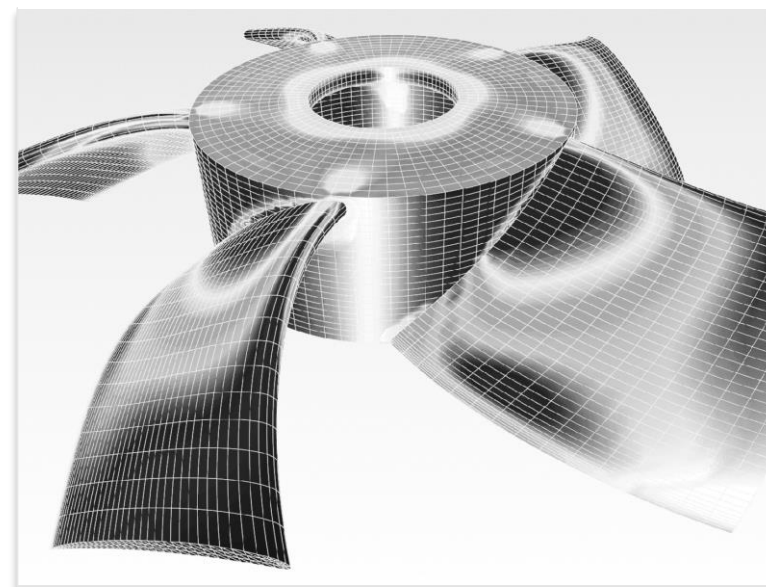
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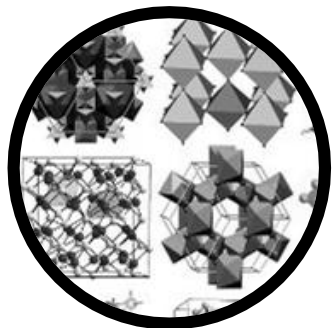


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DESIGN



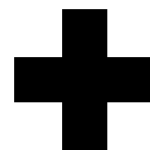


Materials Informatics

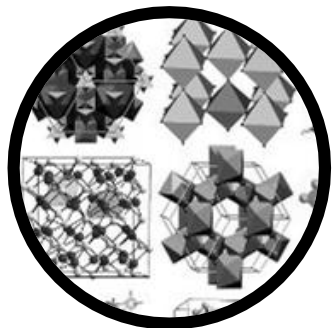
Rapidly accelerating the process of R&D



Major supplier of rubber and plastic components to the automotive industry



Uses AI and multidimensional modeling to propose formulations with targeted properties



Materials Informatics

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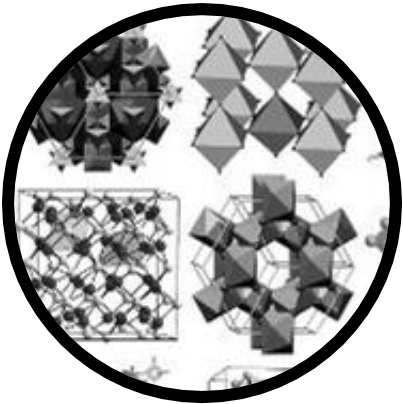


Developed bio-based adhesive for engineered wood and complementary informatics suite

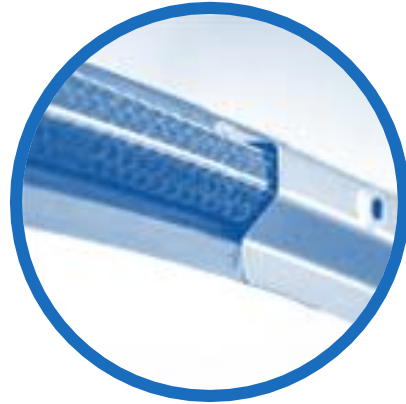
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A toolbox for adhesives innovation



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Multi-material Adhesives

Bonding creates opportunities for more than just the automotive sector

Multi-material bonding can address increased demands in performance and affects multiple industries



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**Joining steel to aluminum
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Joining steel to aluminum and composites



Modular construction enabling wider use of materials





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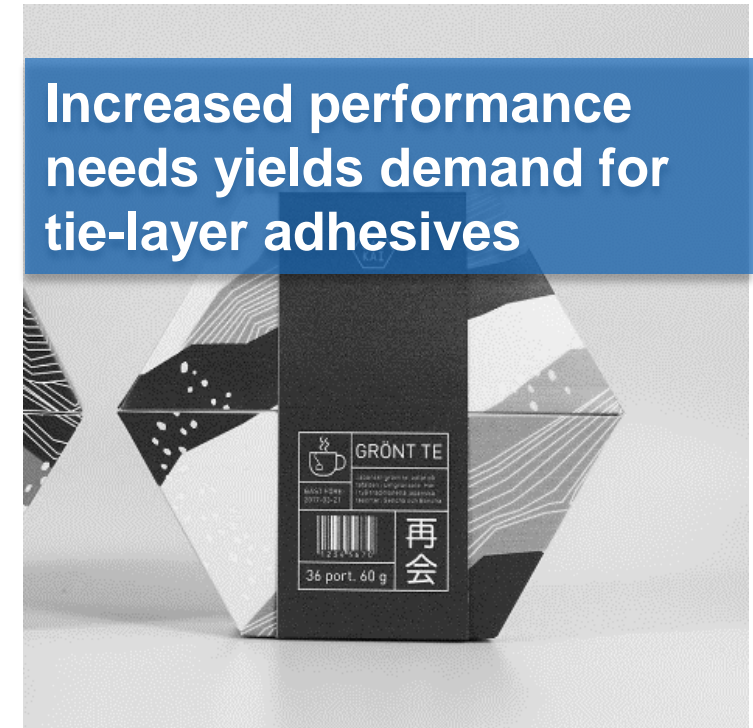
Joining steel to aluminum and composites



Modular construction enabling wider use of materials



Increased performance needs yields demand for tie-layer adhesives





Multi-material Adhesives

Major players focus on epoxies, urethanes, and acrylics

Traditional Chemistries

Already a core area for large corporations

Try to balance strength and elongation



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Traditional Chemistries

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Try to balance strength and elongation

MMAs (methyl methacrylates)

Good elongation for different coefficients of thermal expansion

Fast cure times

Lower strength and durability than epoxies



Multi-material adhesives

Featured start-up activity

Adhesion promoters



LUX TAKE



Wait And See

Developed carbene-based adhesion promoters for a range of plastics and composites like carbon fiber, PET, PEEK, UHMWPE, epoxies, and PUs

Offers high bond strength and failure occurring through the substrate



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Featured start-up activity

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Dry adhesives



LUX TAKE



Wait And See

Offers range of dry microstructure adhesives, fasteners, and gripping materials

Technology relies on van der Waals forces and physical interlocking from an array of micron-scale fibrillar structures

Key Takeaways

1

Materials informatics will impact the chemical industry as a whole – act on it now

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Multi-material bonding is in demand – MMAs are trending and novel approaches are available

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Materials informatics will impact the chemical industry as a whole – act on it now

2

Multi-material bonding is in demand – MMAs are trending and novel approaches are available

3

Start-ups are few, but groups that are already ripe for commercialization do exist



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Thank you for joining us.




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