

Opportunity Assessment – Self-healing Polymers

Case Study

Self-healing Polymer Opportunity Assessment

Client	Leading advanced materials & specialty chemicals company
Industry	Polymers
Products	Self-healing polymers

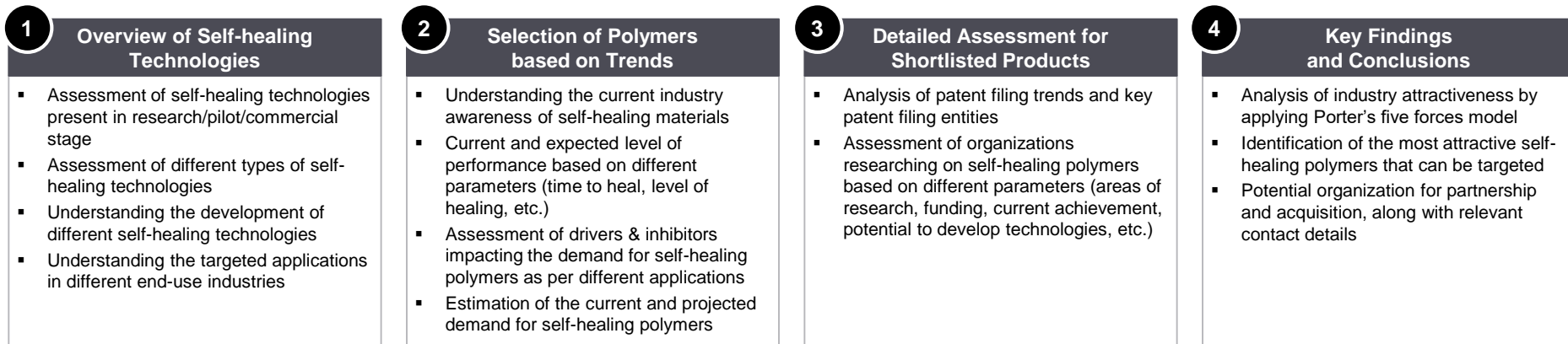
Context

- The client aimed at understanding various existing & upcoming self-healing technologies focused on polymers so as to assess new business opportunities and determine strategic direction in terms of development, collaboration, and acquisition.

Key Business Questions

- Which are the current self-healing technologies?
- Which are the different types of technologies that self-healing polymers are based on?
- What stage of development (basic research, advanced research, pilot stage, and commercialized) are these technologies presently at?
- What is the current industry awareness of self-healing materials?
- What are the drivers and inhibitors impacting the demand for self-healing polymers as per different applications?

Engagement Scope



Self-healing Polymer Opportunity Assessment

Research Methodology

Secondary/Desk Research

- Conducted exhaustive secondary research by referring to Orbit Intelligence, USPTO, ScienceDirect, SpringerLink, and Wiley Online Library as well as research articles published on self-healing polymers
- Scanned paid & public databases such as Factiva, Bloomberg, ICIS, Chemical Weekly, company annual reports, presentations, company press releases, etc.
- Referred to white papers, analyst reports, consortium reports, trade association reports, etc.

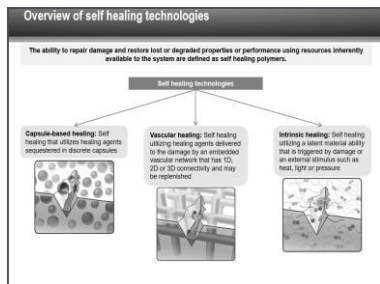
Primary Research

- 28+ interviews with respondents from research institutions, universities, and start-ups, and senior executives from end-use industries

Sample Analysis

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Overview of Self-healing Technologies



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Selection of Polymers based on Trends

Technology scouting: Self Healing Polymers (3 / 4)
Aerospace and automotive companies are actively working on SH technologies

Industry	Industry feedback	Patent/analysis	Awareness
Aerospace	Top aircraft companies such as Airbus & Boeing are aware about self-healing technology. Several steps are taken to be the first to adopt self-healing technology.	Very high level of awareness in aerospace industry. Companies are trying to adopt various extrinsic technologies to the aircrafts.	High
Automotive	Hyundai, Ford, Chrysler, BMW, General Motors are aware of self-healing technology. However, they focus more on the scratch resistant clear coats.	Very high level of awareness. Companies are testing polyurethane based self-healing clearcoats for vehicles.	Medium
Construction	Awareness is aligned with the companies associated with the on-going research.	Moderate level of awareness. Majority of the research is going on in the lab-scale based self-healing technologies.	Low
Defense	US Army and Navy are conducting research with awareness.	High level of awareness. Research activities are going on to develop smart textiles and camouflage coatings.	Medium

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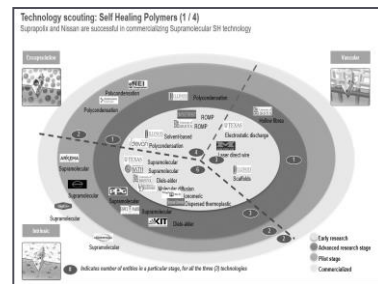
Detailed Assessment for Shortlisted Products

Technology scouting: Self Healing Polymers (2 / 4)
Polyurethane is found to be the potential polymer for commercialization. PU has big growth in self-healing technologies, polyols may grow in the future. DCPD and PMS based technologies may get commercialized.

Encapsulation	Healing agent	Healing agent	Additives to matrix
<ul style="list-style-type: none"> Chlorinated polyurethane Hydroxyl-terminated polyurethane Epoxies Polyurethane Polyurethane 	<ul style="list-style-type: none"> Epoxies Polyurethane Polyurethane Polyurethane Polyurethane 	<ul style="list-style-type: none"> Epoxies Polyurethane Polyurethane Polyurethane Polyurethane 	<ul style="list-style-type: none"> Epoxies Polyurethane Polyurethane Polyurethane Polyurethane

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Key Findings and Conclusions



Thank you

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