



Specialty Industrials



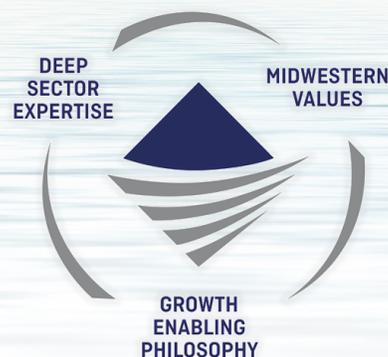
Life Science



Advanced Materials



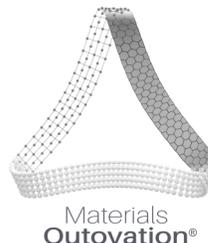
Specialty Chemicals



## Investment Thesis:

### Specialty Polymer Compounding

Dr. Rakesh Kapoor  
Operating Partner - *Materials Outovation*<sup>®</sup>

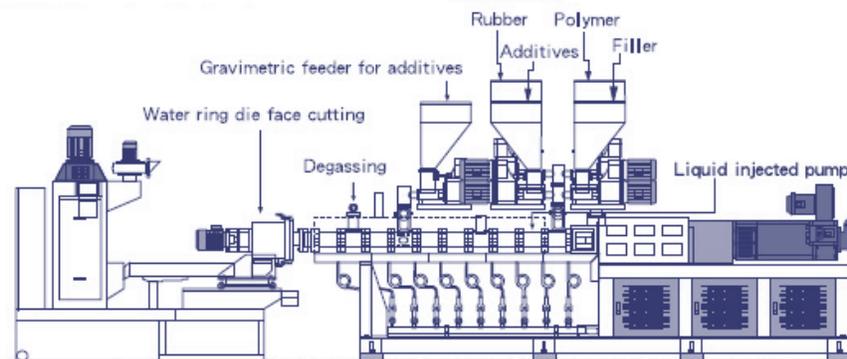


#### Market Overview

The polymer compounding market has been estimated to be at least \$35B<sup>i</sup> and by some perhaps as high as \$55B<sup>ii</sup> to \$58B<sup>iii</sup> in 2019. Compounding consists of preparing polymer formulations by melt mixing polymers, fillers and functional additives via a variety of methods to achieve the desired characteristics.<sup>iv</sup> Suitable melt mixing equipment includes: Twin Screw extruders, Farrell Continuous Mixers, Banbury Mixers and Buss Ko Kneaders.

The ingredients are generally automatically dosed via a hopper and loss in weight feeder system and the order of addition of ingredients can be varied to suit the specific formulation. For example, it might be desired to first carry out a chemical reaction to modify the polymer followed by the downstream addition of fillers and finally minor additives such as thermal stabilizers, color, lubricants etc. Fillers can range from diluents to reduce cost to highly functional materials to provide flame retardancy, dielectric properties, modulus enhancements and others. Fibers can also be added to provide strength, flexural improvements and impact resistance.

This is a rich field and with the right level of formulation and scientific background, it offers significant scope for highly differentiated performance and consequent IP protection possibilities.



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## Investment Thesis

As a sector focused, lower mid-market fund, Edgewater Capital’s investing strategy emphasizes a high degree of technical differentiation coupled with a focus on niche markets. Portfolio companies typically serve a niche where they are highly differentiated; selling process is usually technical and the products are often described as “mission critical”. Thus, **Edgewater is only interested in a narrow segment of the vast polymer compounding market.** Compounders that focus on “difficult to process” materials; newer manufacturing processes – or sequence of processes; novel property combinations with structures carefully engineered to meet an end-customer needs will fit the Edgewater investment criteria.

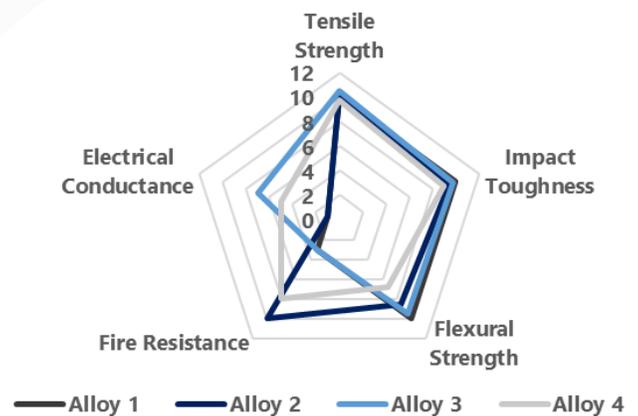
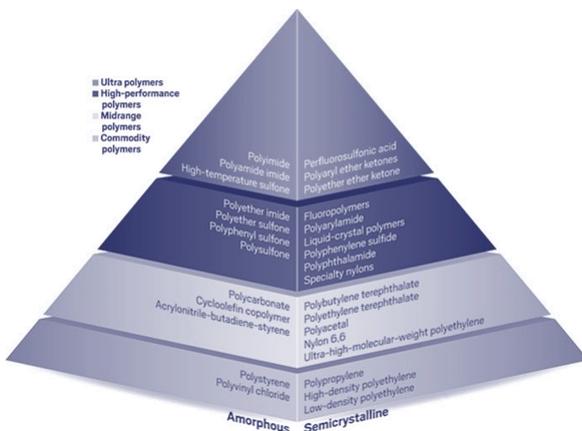
Edgewater previously owned **PolyAd® Holdings** (See Appendix C) and aspires to leverage that experience.

## Materials Outovation® Practice

At Edgewater Capital, Rakesh Kapoor serves as the Operating Partner, responsible for the Materials Outovation® Practice. He has worked continuously in advanced materials since 1981 and in carbon composite and polymers since 1990. For over two decades Rakesh worked at Saint-Gobain overseeing the technical and RandD efforts of several polymer related businesses serving multiple end markets. Edgewater welcomes any questions or inquires. Rakesh can be reached at [rkapoor@edgewatercapital.com](mailto:rkapoor@edgewatercapital.com) (Cell : +1-508-925-0729).

Illustrating these points graphically – one may examine the “classical” polymer pyramid where performance, price, high temperature ability all increase along the vertical axis. A product designer or application engineer often faces the need to optimize at least 2 and often 4 disparate materials properties while balancing the cost of the material to successfully address the end user performance expectations (See spider chart). Specialty compounding provides solutions for such niche applications.

Processing techniques of interest include: distributive mixing, dispersive mixing and combinations thereof, together with reaction extrusion and the ability to make step wise additions and vary the sequence of additions.



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### Appendix A

#### Select Target Niches within Specialty Polymer Compounding

Material	End Industry	Process	Application	Engineering Capability
<b>Cross-linked Olefins and Elastomers</b>	– Wire and Cable	– High energy dispersive mixing	– Flame retardant and Smoke suppressant insulations	– Extrusion / Compounding, Rheological and Thermal modeling
<b>Carbon Nanotubes and Graphene</b>	– Electronics and Aerospace	– Reactive compounding – Reactive Extrusion	– EMI Shielding	– High volume and frequency of sensors and associated data analyses (Industry 4.0)
<b>Inorganic-organic Polymers</b>	– Built Infrastructure	– Flexible Sequencing of additives	– Biocides	– Rapid prototyping – Additive manufacturing.
<b>Coupling Agents and Dispersants</b>	– Specialty Tubing	– Compounding for controlled phase morphology.	– Tubing for Food grade, medical, or with sensors embedded.	– Compounding – Modeling and characterization of morphology
<b>Modified Graft Polymers</b>	– Building and Construction	– Twin-Screw Compounding extruder	– Ductility enhancement of natural polymers	– Kinetics and thermodynamics of reactive compounding
<b>Functionalized Compounds</b>	– High-touch Surfaces	– High shear compounding	– Abrasion resistance	– Additives with high solubility and extractability performance

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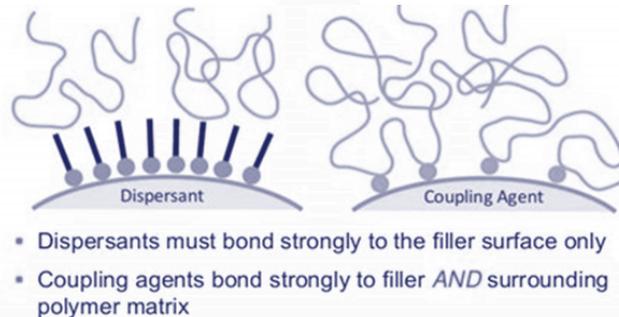


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## Appendix B

### Select Targeted Processing Techniques within Specialty Polymer Compounding

Of particular interest are companies that leverage the use of dispersants and coupling agents to extend the normal ranges of “compatibility” between two or more types of polymers or between polymers and inorganic materials (e.g. ceramic particles).



## Appendix C :

### Case Study of PolyAd® Holdings – An Edgewater Portfolio Company

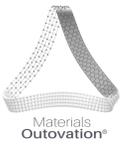
#### Background of PolyAd® Holdings

- Corporate carve-out from BASF
- Seller valued process dynamics, surety / speed of closures,
- Made a “clean break” from BASF, Closed 120 days with no TSAs
- Built standalone manufacturing facility.

#### Business Model Description

- Complex additive solutions critical to customers’ manufacturing and product performance
- Focused on high-value applications / end markets
- Encompassed both organic and inorganic additive blends
- Core strength in nylon additives with a growing presence in other resin additives
- Properties influenced included : rheology, thermal stabilization, uv stabilization, lubrication, odor control, acid neutralization, impact modification, and flame retardancy.
- Highly technical team (15+ Ph.d. level chemists) and dozens of application engineers in the field.
- Highly skilled sales and customer service personnel with global reach
- Compelling customer value proposition resulting in deep partnerships with customers.
- Edgewater developed branded marketing strategy and invested in people and facilities.
- Successfully exited to a larger strategic organization.

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### About Edgewater Capital Partners

Edgewater Capital Partners, headquartered in Cleveland, Ohio, is a sector focused private equity firm investing in lower, middle-market performance materials businesses. We have extensive experience and expertise in niche manufacturers of specialty chemicals, pharmaceuticals, and engineered substances. Twenty years of industry specific investing has allowed us to develop a deep understanding of the complexities and nuances common to performance materials businesses. As a result, we believe expertise in our target markets enables us to quickly and comprehensively understand a company's value proposition, customer relationships, and perceived or misunderstood risks.

### About the *Materials Outovation*<sup>®</sup> Practice

*Materials Outovation*<sup>®</sup> Practice of ECP focuses on businesses whose core theme for growth relies on leveraging the composition, structure, properties, and processing of materials to provide customized performance in a material or a component for a specific application. Material families of interest include metal, alloys, ceramics, glasses, polymers, composites, adhesives, coatings, cements, concrete, and others. Phrases such as "mission critical", "enabling", "high performance", among others are often used to describe the materials and components produced by companies in this practice.

*Materials Outovation*<sup>®</sup> refers to the systematic process of looking "outside" the organization (at suppliers, consultants, other companies, customers, universities, experts, startups) to find ways of triggering innovation "inside" the organization for new markets, new applications, new customers and new technology – all of which enhances highly profitable growth. The professional networks of our operating partners provide a rich source for industry specific contacts.

The practice aspires to instill in each portfolio company world class business tools including environmental health and safety conscious culture, a lean operational culture inspired by the Toyota Production System and a streamlined supply chain – all in a spirit of continuous improvement, set in a backdrop of highly professional governance practices (adopted from the NACD guidelines).

We encourage a transparent open culture, emphasizing management team and employee empowerment including continually investing in the development of our people.

For more information please contact Rakesh Kapoor at [rkapoor@edgewatercapital.com](mailto:rkapoor@edgewatercapital.com) (+1-508-925-0729)

<sup>i</sup>[Global Market Insights](#) (October, 2019)

<sup>ii</sup>[Market view Research](#) (July, 2020)

<sup>iii</sup>[Allied Market Research](#) (May, 2019)

<sup>iv</sup>[Marval Industries](#) (July, 2020)