

Attractive Areas in China's Chemical Industry

Substantial Technological Knowledge Required, Companies Must Also Consider their Capabilities and Resources

As a consultant specializing in the chemical industry in China, I often get asked for attractive areas in the industry — mostly by companies looking to expand their business. I am usually reluctant to answer them right away. This is not because I am afraid to share my knowledge. Rather, I am concerned that there is no universal answer to this question.



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In my experience, success in a specific chemical segment depends at least as much on the capabilities and resources of the individual companies as on the general attractiveness of the market (as measured, e.g., by market size, market growth, average profitability, etc.). Or to put it differently, a company highly competitive in an average market segment may be more successful than a laggard in a very attractive segment.

Particularly Chinese companies tend to have difficulties avoiding the areas in which they are less competent, (see Fig. 1, field "Not for us") as they consider only market attractiveness. For example, many Chinese companies have recently moved into coal chemicals, often without any specific competitive strength such as strong technology or own coal resources — a typical case of a potentially attractive market that requires specific internal capabilities and resources for success. As a consequence, one of these companies, the power-generation company Datang International Power, just quit coal chemicals after substantial losses.

However, despite these reservations, it is still a valid question to ask for current attractive chemical segments in China, and I will give a number of examples.

Coatings

It may be surprising that coatings are included in this list as the sector is rather crowded, with an estimated 10,000 companies active in China. However, there are several high-growth niches even within mainstream subsegments of the coatings area.

For example, functional architectural coatings account for less than 10% of all architectural coatings but have much higher growth rates and profitability than the segment average. Main functionalities are solar reflection, insulation and photo catalytic activity (which may give the



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coatings self-cleaning, anti-bacterial and anti-fungal properties).

Industrial corrosion protection is another attractive coatings area as the application of such materials more and more expands from marine uses to general industrial ones.

Electronics Chemicals

The electronics industry uses an extremely broad range of chemicals. Specialty chemicals are part of many formulations in the different processing steps, for example, in the deposition of layers on silicon wafers and in the patterning of these layers. In addition, some basic chemicals such as gases, acids and solvents are used — however, for these chemicals the purity requirements are much higher than for other applications. Overall, the attractiveness of electronics chemicals derives from the growth of the industry in China as well as from the high value created by these chemicals in the processes. The ongoing trend toward larger wafers and smaller structures will also require advances in the chemicals used, which should protect the segment from commoditization.

Filter Materials

Similar to the membrane materials discussed later, high-end polymeric filter materials will profit from rising environmental standards, concerns about air pollution and ongoing economic growth despite the competition from lower-cost glass-fiber material. Electrostatic dust removal is being replaced by the bag-type dust collector, in which polymeric filters are required. As a conse-

quence, market growth is estimated at 10%-15%. Important polymer types include polyphenylene sulfide, polyimide fiber, polysulfone amide, poly-m-phenyleneisophthalamide and polytetrafluoroethylene, which differ in properties such as chemical resistance, temperature resistance and cost.

Fluorochemical Specialties

There are already overcapacities in some areas of fluorochemicals, e.g., fluorosilicones. At the same time, there are still promising subsegments in fluorochemicals. The recent successful initial public offering of Tianhe, a producer with a strong portfolio in fluorotelomers used to make textile surfaces stain resistant, demonstrates this. Fluoropolymers other than the most common ones such as PTFE also have substantial room for growth in China as their share is much lower than in advanced markets.

Membrane Materials

In Western markets, the use of polymeric membrane materials is already well established in areas such as dairy products and other food, the automotive industry (to recover material from electropainting baths), and in medical applications. In wastewater treatment, membranes replace chemical treatment because of their lower material and labor costs as well as a more consistent outcome.

The chemical industry itself also increasingly utilizes membranes in separation processes as these tend to require less severe conditions and much less energy than other methods.

Emerging biotechnological processes, e.g., for the production of biofuels, are also likely to be important applications. Membrane materials used are mostly organic polymers, including polyethersulfones, polyvinylidene fluorides, polyimides and many others.

Nutraceutical Ingredients

Nutraceuticals are foods with health-giving additives and medicinal benefits. They are somewhere on the continuum between pharmaceutical products and foods. While many nutraceuticals have a natural source, the beneficial effect of others is based on synthetically produced ingredients. Nutraceutical ingredients include dietary fibers, antioxidants, prebiotics, minerals,

probiotics, polyphenols and polyunsaturated fats such as the omega-3 fatty acids found in fish oils.

This market is growing much faster than the one for food — the global rate is estimated to be around 6%-7% as an increasing number of diseases are traced back to deficiencies in nutrition. For China, the growth figure is likely to be much higher as the market is in its infancy but benefits from the worries of urban residents about unhealthy food. However, the recent scandals in the Chinese food sector also make a good reputation and experience in branding essential for success in this market.

The recent acquisition of Aland, a Chinese vitamin C producer, by DSM despite the current low margins in the vitamin business illustrates the potential in this segment. As some nutraceuticals already suffer from overcapacity in China, a more differentiated assessment needs to be conducted before engaging in this segment.

Oil Field Chemicals

With a global market size of about \$18 billion in 2014 and annual growth of about 3%-4%, oil field chemicals are already a fairly attractive segment from a global perspective. In addition, as China currently accounts for only about 5% of the global market for these chemicals, domestic growth rates are expected to be much higher as Chinese oil companies expand their

activities both within China and outside. Among the four basic groups of chemicals, enhanced oil recovery chemicals look the most promising if oil prices remain high, but prospects are also good for chemicals for drilling fluids, chemicals for cementing and stimulation, and for oil production chemicals.

Water Treatment

The water-treatment segment will benefit from increased regulation as well as increased awareness of health-related issues among China's growing middle class. While China already has domestic producers of water-treatment chemicals, the more promising opportunities are in the next two steps of the value chain, namely formulation and services. The combination of stricter regulation and the eventual focus of manufacturing and chemical firms on their core companies should lead to a strong demand for companies that offer complete outsourcing of water treatment.

Many More Appealing Segments

These are just some selected examples of attractive segments — there are many others, with examples including subsegments of lubricant additives, high-end carbon and other high-strength fibers, lithium and its compounds, high-end engineering plastics, environmentally friendly flame retardants, as well as specialty adhesives (as indicated

by the recent acquisition of Tonsan by HB Fuller).

Generally, the vast majority of attractive segments are in the area of specialty chemicals. Most commodity chemicals in China suffer from overcapacity and fierce price pressure — and even in those cases where local capacity is lower than demand, local production is often not competitive with imports from countries with lower raw-materials costs. In addition, competition in commodities is often coming from the huge petrochemical state-owned entities (SOEs), such as Sinopec, whose competitive position cannot easily be matched by other companies because of their integrated value chains and their ties to the government.

In addition, many attractive chemical segments are related to the increasing importance of environmental protection in China. This includes filter materials, membrane materials and water treatment.

Most importantly, almost all attractive segments require substantial technological knowledge that is not yet as widely spread or commercially available as that required to produce basic chemicals. In addition, many segments require application knowledge rather than just production know-how. These requirements serve as substantial barriers of entry to these attractive segments, thus amplifying the importance of company capabilities in determining segment attractiveness — which leads back to the beginning of this paper. However, if a company has the general mindset and resources to compete in an attractive segment and lacks only specific technologies, the acquisition of a competitor may be a solution. This can include the acquisition of a non-Chinese chemical company and transfer of the acquired technology for use in the Chinese market.

Tianhe successfully used an alternative. Instead of buying technology, the company hired a few foreign experts with previous careers in leading fluorochemicals producers, and let them develop the technology locally. While slower, such an approach has its own advantages such as the establishment of a deep knowledge base and lower investment.

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Segment	Key Attraction
Coatings, particularly Functional Architectural	Functional architectural coatings are a high-end, high-growth segment within the competitive architectural coatings market
Electronic Chemicals	High growth of customer industry and high value creation of chemicals used
Filter Materials	Rising environmental standards, particularly in industrial applications
Fluorochemical Specialties	Limited competition and high profitability along with rising consumer incomes (e.g., use for surface modification of outdoor clothes)
Membrane Materials	Increasing use of membranes in many industrial applications, sometimes replacing chemicals (e.g., in water treatment)
Nutraceutical Ingredients	Growing health consciousness and growing income of Chinese consumers
Oil Field Chemicals	Huge growth potential due to low base and accelerating activities of Chinese oil companies at home and abroad
Water Treatment	Stricter environmental regulation driving growth particularly for formulations and services



Fig. 1: Internal and external consideration in determining areas for business expansion.