

# Raw Materials **FACTS**

## SPECIALTY ADHESIVES, SEALANTS & SURFACE TREATMENTS

### CHANGING LANDSCAPE

Despite a recent stream of encouraging economic figures, leading chemical companies continue to evaluate their operations and make tough decisions that are reshuffling the industry. Many will lead to a stronger, leaner industry; some, however, could have serious consequences for the specialty adhesives, sealants and metal treatment sector.

Throughout the downturn, chemical companies reacted quickly to ratchet down capacity and utilization rates in response to dwindling demand. In many markets, this has kept supply in-line with demand and stopped prices from free-falling. However, many industry insiders are now worried that the reductions have gone too far. If demand should come back on-stream faster than expected, demand could easily outstrip supply, which could cause shortages and price escalation. This provides a backdrop for a troubling new development: companies are selling businesses and exiting markets.

As major chemical companies reported Q2 2009 earnings, it was clear that sales are down and margins are pinched. Dow Chemical reported a 31% drop in sales. Celanese, a 33% decline. BASF, a 23% decrease. Now, the price of oil and other feedstocks are on the rise. With margins under siege, even small rises in feedstock costs exert intense pressure on businesses.

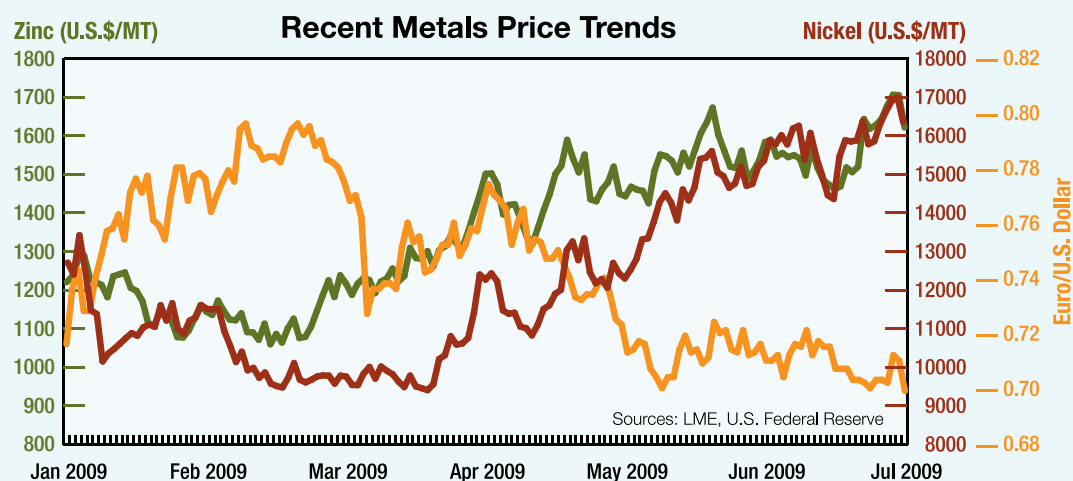
Credit markets are still tight. Businesses are underperforming. And companies are taking a hard look at their portfolios. As part of its restructuring plan following the acquisition of Rohm and Haas, Dow Chemical decided to sell its acrylates business in the U.S. Meanwhile, DuPont Performance Elastomers announced it was exiting the Hypalon market. This set off a chain reaction of product discontinuations throughout the supply chain as customers decided that it would be too expensive to try and replace the synthetic rubber in their formulations.

These decisions are reverberating down the supply chain. The repercussions can be serious, especially when an important supplier decides to discontinue the production of key raw materials used in the formulation of specialty adhesives, sealants and metal treatment products used in the automotive industry.

This often means that products must be reformulated to accommodate raw materials from other suppliers, which is costly and time consuming. More importantly, in light of reduced capacities, there often isn't a lot of extra supply in the market. As a result, securing a new supplier isn't trivial. This is especially true in the case of specialty raw materials produced by a limited number of global suppliers.

The only insurance is to continue to partner with a global supplier who has demonstrated a track record of ensuring supply during the most challenging market conditions. Now more than ever, customers must maintain vigilance on the financial health of suppliers and the changing landscape of supplier relationships. ■

### RISING METALS PRICES PRESSURE PRETREATMENT COSTS



By early August, the prices of zinc and nickel had climbed 50% since the beginning of the year. At the same time, the U.S. dollar has weakened against the euro.

Metals prices have climbed steadily this year and are now putting pressure on the cost of raw materials used in the formulation of metal pretreatment products. In July, the International Monetary Fund's Metals Commodity Index was up 26% for the year, and prices continued to increase in August. A number of factors, including rising production costs, reduced capacities, unexpected buying from China's State Reserves Bureau (SRB), exchange rates and investor speculation, are to blame for the upward trend in metals prices.

#### Zinc

Zinc metal is mined around the world and traded on the London Metal Exchange (LME). It is the precursor to zinc oxide, which is used as an anti-corrosive in metal pretreatment products and coatings. The price of zinc oxide tracks zinc metal prices, which have climbed 50% since the beginning of the year.

As zinc demand and prices dropped last year in response to the global recession, many mines and smelters cut capacity. At the same time, rising production costs triggered the closures of high-cost operations. According to Citibank, 10% of global zinc production was offline by the end of 2008. Additional closures in early 2009 brought the level up to 18%.

The construction and automotive industries account for over 70% of global zinc consumption. These industries have been hard hit by the global recession; as a result, zinc demand is down almost 15% in 2009. However, improving housing data and low automobile inventories coupled with government incentives that encourage consumers to buy vehicles indicate that zinc demand could be poised for a rebound.

#### Nickel

Nickel is also mined in deposits around the world and traded on the LME. Nickel metal is the precursor to a number of nickel compounds, which are used in electroplating and in metal pretreatment products and coatings.

The nickel market has experienced similar price pressures as zinc, including higher production costs, dropping demand and shuttering of capacity. According to Citibank, 23% of global nickel production was offline by the end of 2008.

Over 65% of the world's nickel is used to produce stainless steel. Demand has been down this year but is rebounding. *Metal Bulletin* reports that production is at or above pre-crisis levels at China's stainless steel mills and that mills in western countries are beginning to restock. By early August, nickel metal prices had climbed 50% since the beginning of the year.

A labor strike at Vale Inco's Sudbury, Canada, nickel mine is keeping the pressure on prices. The mine produces 10% of the global nickel supply. Workers at

the company's Voisey's Bay mine and Port Colborne refinery are also on strike. As a result, the company has declared force majeure on production. The strike may be prolonged as the union may not return to negotiations for four-to-five months.

#### Inventory Restocking & Currency

Earlier this year, China began aggressively buying commodities on the world markets. By the end of May, China's zinc imports were over five times 2008 levels. Total nickel imports in June were up 64% month-over-month and 405% year-over-year. This unexpected surge in demand has contributed to the rally in zinc and nickel prices. Analysts expect similar restocking by other countries to continue to support metal prices.

The value of the U.S. dollar also plays a crucial role, as the currency and commodities prices tend to move in opposite directions. This means that when the dollar is losing ground against other currencies, as it has since February 2009, metals prices rise. That's because a weaker dollar boosts the buying power of holders of foreign currencies, making it less expensive for them to buy dollar-denominated commodities.

#### Outlook

Metals prices usually react to supply and demand signals. Now, base metals are, essentially, following movements in the global equity markets. Positive economic news raises metal prices. Doubt about the strength of the recovery moves prices lower. As confidence grows, large investors, including institutional investors, hedge funds and pensions, are willing to take on greater risk in the search for higher returns. Many are moving out of safer holdings and into commodities. This added buying sets off a chain reaction of positive sentiment throughout the market that leads to increased buying and rising prices.

Volatility is increasing as speculators try to time the market and capitalize on the long-anticipated upsurge in industrial demand. As a result, speculation is now overshadowing the fundamentals of supply and demand. This makes the markets increasingly jumpy and renders it difficult to forecast future metal price trends.

In the short term, zinc and nickel prices are trending higher. J.P. Morgan recently revised its forecast for yearly zinc prices up 13% and nickel up 30% from earlier forecasts. Further out, Goldman Sachs is predicting a shortage of zinc in 2010.

"We expect a redux of 2008, when severe supply constraints forced the rationing of demand through sharply higher prices to keep markets balanced," Goldman Sachs analysts wrote in an early August report.

All of these factors will continue to drive metals prices higher. This will put pressure on the cost of raw materials used in metal pretreatment products. ■



## ALTERNATIVE FEEDSTOCK

Exxon is investing \$600 million into algae farms that will transform sunlight into biodiesel. In a quest for the commercially viable conversion of methane to olefins, Dow Chemical awarded \$6.4 million in grants to universities in the U.K. and Illinois last year. And as oil prices escalated last summer, sales of NatureWorks' corn-based polylactic acid (PLA) were growing by 20-30%.

Major oil and chemical companies are investing serious R&D resources into the search for alternative feedstocks to many of the chemicals that we use every day. The success of products like PLA bioplastics is a sign that the market supports a shift to a sustainable alternative. Unfortunately, the path from idea to process to product is a long, challenging, costly one.

In a recent survey by ICIS/Genomatica, 61% of respondents estimated that five years was the minimum time frame to go from conception to commercial

production of a sustainable chemistry. And while the shift to renewable alternatives may eventually prove to be a lower-cost option to producing petroleum-based feedstocks, getting there is not without cost.

High capital costs can be a hurdle. And since many projects seek to replace feeds sourced from petroleum, they are measured against crude prices. When prices were rising in 2008, the economics of many projects improved. At today's prices, and in the current economic climate, many projects may fall by the wayside.

"Until the price of oil is back up, there will be some hard times," Bob Davenport, an analyst at SRI Consulting told *Chemical Week*. "Some commercial-scale projects are apt to be delayed and the leading edge technologies also may not become commercialized until later than once thought."

Still, many companies are pushing forward with the

R&D, saying that it isn't so much the price of oil that motivates their decisions as its extreme price volatility, which can quickly erode margins. In the ICIS/Genomatica survey, 57% of respondents

agreed that their company should seek to reduce exposure to the petroleum-based commodity markets.

One problem is that demand for many of the existing sustainable chemistries is not large enough to compete with petroleum-based feedstocks. For example, biopolymers like PLA cost nearly twice as much as traditional plastics at current oil prices. And while a recent study by the Grocery Manufacturers Association and Deloitte discovered that 54% of shoppers consider sustainability in their buying decisions, only 22% actually follow through and buy green products. This corroborates a March 2009 study by Miller Zell in which 50% of shoppers polled were willing to pay a premium for a sustainable product, but the majority would not pay more than \$0.10.

Similar relationships are evident throughout the supply chain. Customers pressure suppliers to come up with sustainable alternatives that will satisfy demanding consumers and help to mitigate the volatility in feedstock prices. At the same time, they balk at the higher initial costs that must be charged in order to bring these technologies to market. Until technologies can be scaled up economically or the supply chain is willing to partner in the cost, many sustainable chemicals will not soon displace petroleum-based alternatives – at least at today's crude prices. ■

## ROUND UP: ADHESIVES & SEALANTS RAW MATERIALS

Rising feedstock prices are putting pressure on many of the raw materials used to manufacture adhesives and sealants for the automotive industry. If feedstocks remain at current levels, adhesives and sealants prices will soon rise.

### Rubbers

Synthetic rubber compounds, including styrene-butadiene-styrene (SBS), styrene-isoprene-styrene (SIS) and styrene-butadiene-rubber (SBR), are key components of many hot melt adhesives used in the automotive industry. Styrene is up 111% so far this year. Butadiene has climbed 196%.

Refiners are cracking lighter feeds from less-expensive natural gas instead of heavier, costlier feeds from naphtha. This improves refinery economics but reduces the production of many key feeds, like C4 and C5, that form the building blocks of synthetic rubbers. This has tightened the supply of butadiene and isoprene, and led to higher prices. Suppliers recently announced additional price increases for SIS and SBS.

### Epoxy Resins

Epoxy resins are used in a wide range of applications, including the manufacture of adhesives, coatings and structural parts used in wind turbines and aerospace applications.

The global supply of feedstocks required to make epoxy resins has been tight. This has limited global epoxy production and caused prices to rise. Bisphenol-A (derived from benzene) is reacted with epichlorohydrin (derived from propylene) to form epoxy. Benzene prices have climbed over 260% this year. The supply of propylene has tightened in response to the shift to lighter cracking slates. As a result, propylene prices have doubled in 2009.

### Paraffin Wax

Tight global supply, limited producers and a shift in the lube refining industry put pressure on both the supply and price of paraffin wax in 2008. Prices reached a peak in August 2008, doubling over the prior 12 months, and then staged a modest retreat. These dynamics persist today and, despite a drop in demand in late 2008, renewed supply tightness means that wax was one of the first raw materials to rebound.

Price pressure is building again. Paraffin wax is a byproduct of Group I base oil production. High feedstock costs and low base oil values have forced base oil producers to curb production. Some are diverting streams to fuel production, which has reduced wax output. As a result, wax supply is balanced-to-tight and U.S. producers began to implement price increases in May ranging from 5-10%. If demand picks up faster than expected, prices could easily surpass last year's peak.

Rising feedstock costs are also affecting the price of acrylic resins (propylene) and plasticizers (toluene; up 67% in 2009). ■

## SPOTLIGHT: MINOR RAW MATERIALS

### Hydrofluoric Acid

Hydrofluoric acid is produced by reacting fluorspar ( $\text{CaF}_2$ ; also called fluorite), a widely-occurring industrial mineral, with concentrated sulphuric acid.

China is the leading producer of fluorspar. The global supply of the mineral tightened dramatically in 2007 when China raised the export tax on fluorspar as part of a policy to conserve the mineral for domestic use and to stimulate its fluorocarbon industry. This led to higher global prices and set the stage for other producers of high-quality fluorspar to better control pricing through supply.

Since producers can ramp up or scale back production in response to demand, they can successfully control prices. High demand, especially on the spot market, drove prices higher in 2008. At its peak in Q4 2008, the price of fluorspar had climbed almost 140% since early 2007. Fluorspar prices began to retreat slightly in 2009 as downstream demand dropped in response to the global recession. Today, prices are still well above early 2008 levels and the industry does not expect to see further price drops, especially since demand has picked up as customers replenish inventories.

The high level of raw material costs, along with escalating energy prices, has led some hydrofluoric acid producers to announce price increases.



### Titanium Dioxide

Titanium dioxide ( $\text{TiO}_2$ ) is extracted from ilmenite and rutile, minerals that must be mined. It is used as a pigment in adhesives and sealants, as a specialized anti-corrosive coating for metals and to create a unique phosphate for cleaning metals.

Chronic low profitability, along with long-term trends in raw materials and energy costs, and the onset of the global financial crisis last fall forced many  $\text{TiO}_2$  producers into the red for 2008. In fact, one major North American producer sought Chapter 11 bankruptcy protection.

Now, companies are adamant about rebuilding margins. They say it is the only way that they can survive and continue to ensure supply in the years to come. Prices rose almost 20% in 2008 and companies tacked on energy surcharges in the fall. This year, producers have continued to steadily raise prices. Every North American producer of  $\text{TiO}_2$  implemented price increases in August. Now, announcements for September increases are rolling in.

### Sodium Nitrite

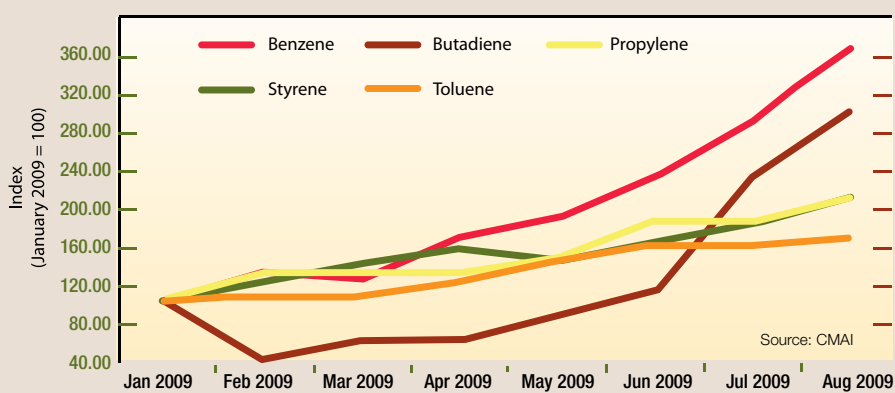
Sodium nitrite is used in metal phosphating, which helps to prevent corrosion and prepares metal surfaces for improved paint adhesion. It is produced by reacting ammonia with either caustic soda or soda ash.

The single U.S. producer uses soda ash to produce sodium nitrite. CMAI reports that soda ash supply and demand was "extremely tight" in 2008 and producers secured "healthy price increases in many markets." Prices rose 16% at the start of 2009 and have held steady since. Ammonia prices dropped from 2008 highs but are expected to climb in coming weeks.

Despite gyrations in raw materials and energy costs, the price of sodium nitrite effectively doubled in mid-2008 and has held steady ever since. At the time, the U.S. Department of Commerce determined that German and Chinese companies were selling sodium nitrite into the U.S. market at significantly less than fair value and imposed tariffs on the imports.

Now, the combination of tariffs and a monopolized market has resulted in sharply higher prices for sodium nitrite. This is driving up the cost of metal treatment products. ■

Recent Feedstock Price Trends



The prices of feedstocks for the raw materials used in adhesives and sealants formulations have been rising steadily since the beginning of the year.