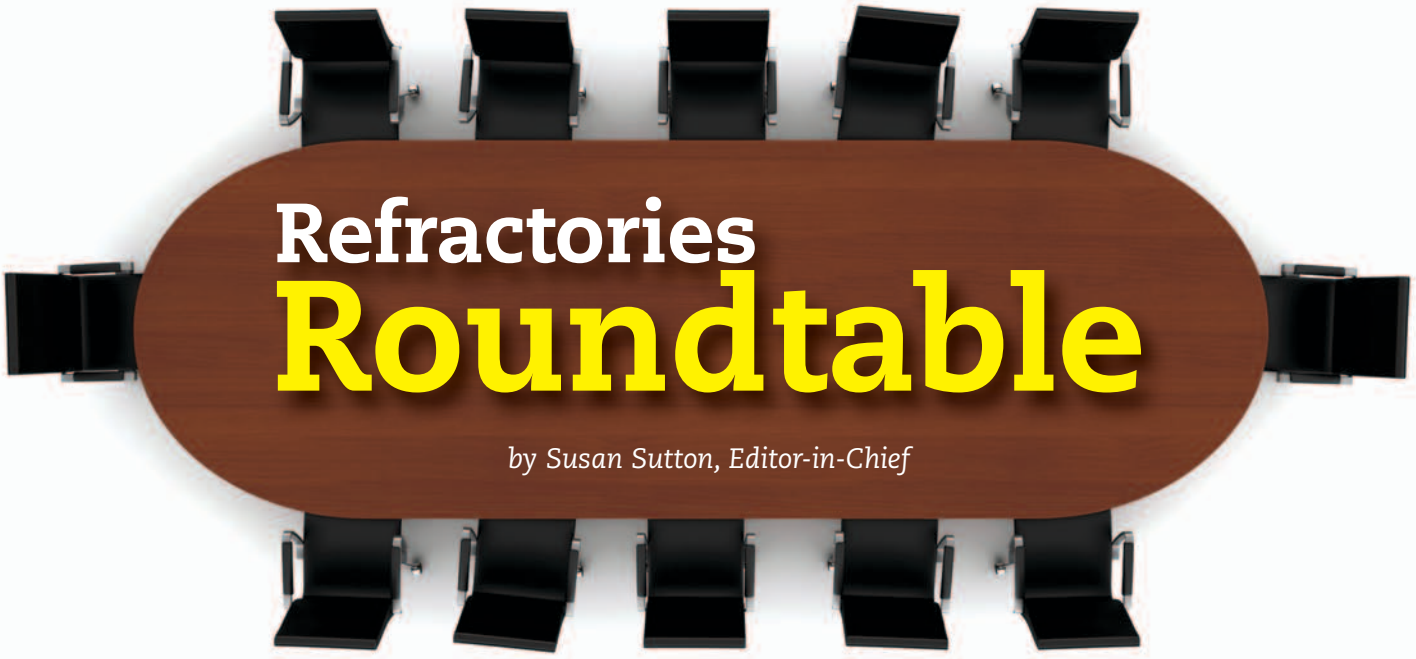
➤ **The refractories industry faces challenges, but many opportunities are available.**



Refractories Roundtable

by Susan Sutton, Editor-in-Chief

According to a study released earlier this year by The Freedonia Group, demand in the worldwide refractories market is expected to grow 3.4% per year through 2016, reaching 46.3 million metric tons valued at $46.5 billion in product sales.[1] I recently posed several questions to industry leaders and our social media community in order to delve deeper into this longstanding and often tumultuous industry.

Is the refractories industry benefiting or suffering from the increasingly global economy?

Michael "Mike" Graeff, Koch Knight: The refractories industry, in general, is benefiting from the global economy, especially if you have a unique product or can bring other value-added services.

Luis Granes, Sauereisen: The global economy is a double-edged sword. The higher demand of products and services brings an increase in the prices. There is more demand for raw materials and suppliers are not always ready to meet this new request, so prices go up exponentially.

XiaoChen Liu, Traxys: Yes, it goes up and down with the macro-economy.

Ronne Proch and Tim Leitzel, Zircoa Inc.: Fifteen to 20 years ago, increasing global competition led to consolidations and downsizing of refractory research staffs on both supplier and customer sides, slowing progress in refractory development. Some of the earlier developments created such large improvements in life that volume decreased dramatically, which placed additional stress on the refractories industry.

Now, globalization is opening new markets. The drive to compete globally causes everyone to strive for greater efficiencies to remain cost competitive. Some solutions are based on technology that goes beyond the capabilities of current processes and refractories. Fueling this competition are large investments in R&D in developing countries like China.

Doug Thurman, Sunrock Ceramics: I think the answer to this question depends on which markets you participate in and how specialized you are. For example, our company specializes in custom refractory shapes in support of very severe applications, mostly consumables like kiln furniture or pusher plates (used in high-temperature pusher furnaces). We also do some specialty types of lining bricks, hearths, muffles, etc., for very aggressive chemistry applications. So for us, the drivers are technology-related in response to processing temperatures that continue to increase, cycles that keep getting faster and atmospheres/chemistries that are ever more reactive.

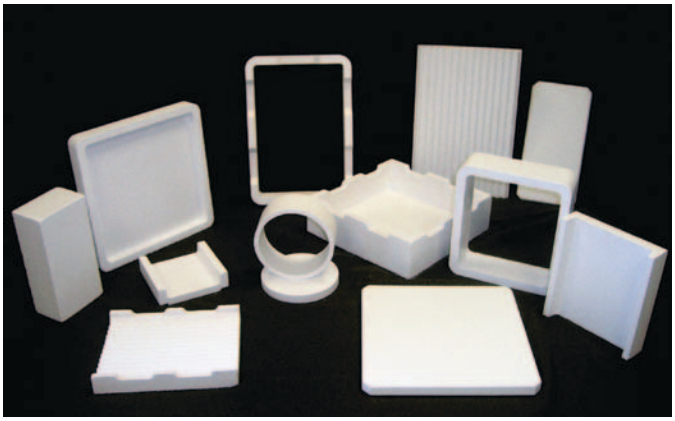
This is true whether our customers are in North America, Europe or Asia, and it has opened up opportunities for us in an ever-expanding range of thermal processing environments. More broadly speaking, globalization has brought down the cost of many raw materials but has increased the risk of volatility. The production swings either from or to huge overseas markets such as China are having a bigger impact on various local markets as the world becomes a more unified marketplace.

What does the employment picture look like in the refractories industry?

Seth Panyin Boamah, HFH: Employment in the refractory sector in developing countries like Ghana where I live is nothing to write home about.

Graeff: From my perspective, employment is rising, albeit slowly. That's a change from the past 5-10 years.

Granes: New equipment and technologies change the face of the manufacturing business all over the world. The more technologically advanced the mixing and packing equipment become, the less human intervention is needed. As more com-



Refractory shapes. *(Photo courtesy of Sunrock Ceramics.)*

puter-controlled equipment is available, fewer workers are needed. The same thing happens to mines and assembly lines.

Proch and Leitzel: Our specialty refractories products are expanding, with potential for at least 100% growth in the next five years. That creates good demand for a wide range of employment needs.

Thurman: Given the increasing severity of processing requirements, particularly related to the production of many advanced materials, we have been seeing steady growth in employment related to our business. As discussed, though, we are a niche player. I would suspect in traditional refractory markets, such as the steel industry, market growth (and therefore employment growth) may be harder to come by, at least in the U.S.

How is the availability of raw materials currently affecting the refractories industry?

Proch and Leitzel: Emerging economies and changing trade regulations in various parts of the world have created wide swings in price and availability of some materials.

Thurman: Our continual focus with regard to raw materials is better and better purity and consistency to help us make better-performing products at competitive prices. We have not found general availability to be an issue, though. There is definitely a consolidation of suppliers happening, but even with that they are competing aggressively. So I think our company is less affected by commodity and availability swings than other sectors of the refractories world because of the specialty, niche nature of what we do.

What has been the most significant technological advancement for the refractories industry in the last several years?

Proch and Leitzel: Speaking from the perspective of zirconia, the most significant advancement and opportunity is as much in application technology as materials technology. Both go hand in hand. The need for new processes and higher efficiencies, in some cases, drive the process beyond the capabilities of current refractories. Higher temperatures and lower energy consumption are just two of many drivers that are opening new doors.

Thurman: I think the steady progression toward better chemical purity and more extreme processing parameters where refractories are being used has been and will continue to be a factor for the entire industry over time, even the more traditional commodity arenas. Therefore, raw materials must continue to get cleaner and more consistent, and the producers of refractory products must increasingly become problem solvers, as opposed to just selling the same product to the same industry that they have done in the past.

If you look into a crystal ball, what do you see in the refractories industry's future?

Granes: Sorry, my crystal ball is cloudy about the future. Nanotechnology will bring new products that were not able to be done before.

Proch and Leitzel: The future is mixed. New opportunities continue to emerge. Meanwhile, improved performance and changing technologies will reduce the volume of refractories required in other applications. Globalization and emerging economies, while increasing demand, also support new refractory suppliers. That requires all who consider themselves to be leaders in the industry to be especially diligent and agile as new local competition emerges.

Is that a threat or opportunity? It's both. It requires us to think differently, to change, and to grow. Rather than considering refractories an old industry lacking the glamour of newer high-tech ceramics, I would call it a vibrant industry that offers many challenges and exciting opportunities for anyone who is just beginning their career in materials science.

Thurman: To me, the answer to this question goes hand-in-hand with the previous question on technological advancement, at least in the advanced economies of the world. Namely, to be successful and to grow, I believe players in the various refractories markets must focus on being problem solvers and creators of value for our customers, and not just low-priced commodity sellers of the same products as yesterday.

This will drive a more diverse segmentation of markets and more growth in specialized products for given applications, rather than trying to just match up the best "off-the-shelf" product for an application. Manufacturing processes will become more geared to flexibility and shorter production runs of more specialized products. Success will come to those who best understand the evolving needs of their customers and who can respond quickly and economically.

To find suppliers of refractories products, visit www.ceramicindustry.com/suppliers.

Reference

1. *World Refractories* (published March 2013, $6,100), The Freedonia Group, www.freedoniagroup.com.