Message from the New President

Welcome to a New Year!

Reflections on 2014 and Looking Ahead to Successes in 2015

Welcome to 2015 and all the challenges and successes that it will bring!

It seems like 2014 rolled by quickly, and it is always good to reflect on the major activities of the Perlite Institute in the past year. The Board got together in Philadelphia this past April to have a meeting and visit Pennsylvania Perlite. Our Board meetings have become very action-oriented, and we have really benefited from the committee structure over the last few years. The website is really impressive, and our membership continues to grow. In October, we had a fantastic meeting in Park City, Utah, and visited the Hess Pumice/Perlite operation in Malad, Idaho. The hospitality we receive at all of our member facilities is truly appreciated and underscores one of the many benefits of membership.

Here in North America, the economy remains robust and shows no signs of slowing down. In the perlite world, we have seen a growing market for expanded perlite as a component for lightweight pet litter blends. This will likely be an ongoing trend as ergonomics and functionality take a bigger share of the market demand versus traditional non-clumping litters. Our membership continues to push perlite into more innovative and exciting applications and the overall market will grow. The gas and oil sectors have had major growth this year, and that should result in additional opportunities for cryogenic perlite.

Looking forward to 2015, our membership drive continues to be an ongoing effort. The Board will be meeting again this spring in Harrisburg, and we will include the staff of the Perlite Institute to ensure that we engage all the resources available to us to serve the group.

The communications group continues to drive updated and new information to our website, and they have really done an outstanding job.

Our annual meeting will take place in Barcelona, Spain, sometime this October, and we will be working diligently to make it a full and rewarding experience.

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Message from the New President

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program. Anyone who has ideas, requests or potential speakers in mind is encouraged to get in touch with the Perlite Institute staff to share that information.

I am really excited to be taking over as president of the organization and hope to provide sound leadership and direction for the next two years. Additionally, I want to thank Linda Chirico for all her efforts as president for the last two years as well as the rest of the Board and committee members for their dedication. Finally, thank you to all the members who continue to make the Institute possible and help shape the future of perlite worldwide.

Best wishes for a happy and prosperous 2015!

—Matt Goecker

Meet Matt Goecker

Matt joined EP Minerals in Reno, Nevada, in 2007, but he has been in the minerals business since 1996. EP Minerals is a producer of diatomaceous earth, perlite and montmorillonite clays, which are used in a variety of applications, including filter aids, absorbents and fillers. Prior to joining EP Minerals, Matt was the business development officer for Zyvax, a chemical compound manufacturer for the composites industry. He also spent nine years with Imerys in various roles, including global distribution manager. His minerals career began with Evans Clay and Medusa Minerals, producers of air-float kaolin and calcium carbonate. Matt holds bachelor’s and master’s of science degrees in agriculture and resources economics from the University of Vermont.

As he steps into the role of president of the Perlite Institute, Matt says his goals for the organization match up with the Institute’s mission statement developed several years ago.

“We need to find additional ways to promote the growth and applications for perlite throughout the world and increase the awareness of our membership as to what those opportunities are,” he says.

He hopes to expand the membership base and find ways to include synergistic companies that will broaden our base of knowledge and expertise. “I look forward to my term as president of the group,” he says, “and welcome input and suggestions as to what members expect to gain from their involvement in the group.”
Did you make some New Year’s resolutions for 2015? I’d like to suggest a couple more for you to add to your list.

• Get involved in your professional trade association.

The Perlite Institute has some very active committees, and we would like you to consider participating in one of them! The 2015 committees are:

  Communications – Jerry Mishler and Rick Willis, co-chairs
  Meetings and Membership – Matthew Malaghan, chair
  Technical – Richard Barabé, chair
  Research – Kathryn Louis, chair

These committees are working on very important projects that benefit the entire membership, and you can provide guidance and input by joining one of them. The Willingness to Serve Form is available from the Perlite Institute website or can be obtained by sending an email to info@perlite.org. It’s very easy to get involved and you will not only be helping the Perlite Institute, but will meet new people in the industry for your own networking. It’s a great way to enhance your membership experience!

• Attend a webinar this year.

The Perlite Institute’s Board of Directors made webinar access FREE! This benefit is now part of your membership dues. So, take advantage of the wonderful educational opportunities being made available. And keep in mind that it’s not just available to the company president. Anybody who works for your company can participate! Use the webinars as an employee benefit and allow them to participate in the webinars. Hold a discussion after the webinar with those who were involved to gain feedback and ideas on how to improve your internal operations. Take advantage of this FREE benefit!

• Register for the annual meeting.

There is still no better way to network and obtain valuable knowledge and connections than through attending the annual meeting. In 2015, we will be meeting in Barcelona, Spain. The committee is working diligently to put together another outstanding program, including top-notch speakers and tours. Please consider attending the annual meeting or sending a representative from your company if you are unable to attend. We guarantee you will pick up something of value that will make it worthwhile to be there!

• Join a social media outlet and participate.

Social media is a communication vehicle you can no longer ignore. Facebook, Twitter and LinkedIn are here to stay! You are never too old to learn how to use social media, and you may be surprised by what you gain from participating in just one of these vehicles. Just pick one and start by watching the interaction. As you get more comfortable, you can make a comment or answer a question. Think about all the opportunities you may be missing out on by not having your company mentioned on some of the discussion threads. It’s another marketing tool that is on the rise, and you don’t want to miss out on the opportunities presented. The Perlite Institute’s pages can be found at the following links:

Consider incorporating these New Year resolutions into your existing list. I think you’ll be glad you did!
The New Year Brings a New Board

The Perlite Institute begins the new year with a new board, elected at the Annual Meeting last September in Park City, Utah. The following officers will serve in 2015:

**President** – Matt Goecker, EP Minerals, LLC

**Vice President** – Matthew Malaghan, Australian Perlite Pty Limited

**Treasurer** – Keith Hoople, Midwest Perlite, Inc.

**Past President/Advisor** – Linda Chirico, Carolina Perlite Company, Inc.

In addition, the following members will serve as directors in the coming year:

Richard Barabé, Perlite Canada
Sebastien Caspard, Imerys Performance & Filtration Minerals
Michael Dunlavey, PVP Industries
Mike Hess, Idaho Minerals, LLC
Jerry Mishler, Supreme Perlite
René van der Mark, Pull Rhenen b.v.
Rick Willis, Silbrico Corporation

Make Your New Year’s Resolution: Get Involved in the Perlite Institute

All nonprofit organizations rely heavily on their members to assist with activities that are identified as important to the positive direction of the organization. The Perlite Institute is working to develop active committees within the association and is hoping you will volunteer your time and talent to the organization.

Committees typically meet by conference call, and members and staff e-mail and call each other to communicate. The average amount of time devoted to committee involvement is two to four hours each month. The more volunteers we have on committees, the more successful we will be as an organization.

Please volunteer to serve on a Perlite Institute committee today! [Click here](#) to access the Willingness to Serve form.

To learn more about other membership benefits, [click here](#).

Who’s Visiting www.perlite.org?

Did you know the Perlite Institute website, [www.perlite.org](http://www.perlite.org), receives thousands of visitors each month? Consider these facts about web traffic to the site during the third quarter of this year:

- During October, November and December 2014, the site had **9,724 visits**.
- Of those visits, **76 percent** were from new visitors.
- A total of **21,125 pages** were viewed during this three-month period.
- The average visitor viewed **2.21 pages** per visit and spent approximately **1.6 minutes** viewing each page.
Imerys Signs Deal to Absorb S&B Minerals

Imerys and S&B Industrial Minerals have announced an agreement among their shareholders to combine S&B’s principal business activities with those of Imerys, the world leader in industrial minerals. The deal between the France-based Imerys and S&B, a company originated in Greece and which has had strong international expansion over the last 20 years, was signed Nov. 5.

“This transaction will be a decisive step in the global growth strategy of S&B and will enable us to leverage on the combined strengths of the two companies for the benefit of our customers,” said Bill Mihalopoulos, perlite business unit manager of S&B’s Americas Region.

The transaction remains subject to the approval of the relevant regulatory authorities and is estimated to be completed during the first quarter of 2015. Until then, business remains as usual.

At the completion of the absorption process, the Kyriacopoulos family will be in control of 4.4 percent of Imerys’s shares. Ulysses Kyriacopoulos, chairman of S&B, will hold one of the two family seats on the Imerys governing board.

“This transaction represents a major milestone in Imerys’s development strategy,” said Gilles Michel, chairman & CEO of Imerys. “By welcoming S&B’s teams, sharing with us similar culture and values, we will strengthen together our global positions in the mineral-based specialty solutions for industry.”

Ulysses Kyriacopoulos, chairman of S&B, added, “By combining our operations with the world leader in industrial minerals, S&B takes a decisive step in its global growth strategy for the benefit of its customers. Driven by the same strong entrepreneurial values, our employees will find new development opportunities in this combination. I would be honored to join the Board of Directors of Imerys alongside representatives of its controlling shareholders and participate in the strategic decisions that will accelerate its growth.”

See page 6 for the press release from Imerys.

The 2015 Annual Meeting: Join us in Barcelona, Spain!

Don’t miss out on the 2015 Annual Meeting to be held this fall in Barcelona, Spain. Watch the Perlite Institute website and check your email as details about this event become finalized.

Join a Committee, Make a Difference

You can make a difference with the Perlite Institute and contribute to the industry by getting involved. Consider becoming a committee member. Contact any of the chairs below to learn more about a committee and how to listen in on a meeting:

Communications Committee
Jerry Mishler, Co-Chair
jerry@perlite.com
Rick Willis, Co-Chair
rwillis@silbrico.com

Horticultural Committee
Chair to be determined

Meetings and Membership Committee
Matthew Malaghan, Chair
matthew.malaghan@perlite.co.nz

Technical Committee
Richard Barabé, Chair
info@perlitecanada.com

Research Committee
Kathryn Louis, Chair
kathryn@sungro.com
PRESS RELEASE

PARIS, NOVEMBER 5, 2014

Imerys accelerates its development and concludes a strategic combination with S&B, a major player in industrial minerals

Imerys announces today a strategic combination for the integration of the main activities of S&B, a major player in industrial minerals held by the Kyriacopoulos founder family (61%) and Rhône Capital (39%). Through this operation, Imerys would accelerate its development by enlarging its specialties offer. The transaction, partially paid in Imerys shares, would rapidly create value for Imerys’ shareholders, based on a €525 million equity value for 100% of the shares, increased by a performance amount not to exceed €33 million. In this context, the Kyriacopoulos family, S&B’s shareholders for more than 80 years, would become stockholders of Imerys together with its controlling shareholder, GBL group.

A major player in industrial minerals with a wide range of products and applications, S&B is serving diversified end-markets in Western Europe, North America as well as European and Asian emerging countries. A global supplier and European leader in bentonite (binders for foundry, sealing solutions, additives for drilling and for consumer products), S&B is the world leader in continuous casting fluxes for the steel industry as well as in wollastonite (functional additives for polymers and paints). S&B is providing also perlite-based solutions used in construction materials and horticulture.

Acting in 22 countries, S&B delivers a robust operating profitability. Its efficient industrial layout, based on abundant and well-located mineral resources, notably on Milos Island (Greece), and on performing assets, provide the company with very competitive positions in its markets. European activities of bauxite production for metallurgy would be excluded from the proposed transaction perimeter. The scope of the contemplated transaction had revenues of approximately €207 million and a restated EBITDA margin close to 20% for the first-half 2014.

This strategic combination would be accretive to the Group’s net income from current operations per share from the first year of integration and value creative from the third full year of consolidation, thanks especially to the significant development synergies that are expected. The consideration should be paid in cash for about €311 million, financed by Imerys’ available financial resources. The balance of €214 million should be paid in Imerys shares to be issued on a preemptive basis exclusively to the Kyriacopoulos family. Including S&B’s net financial debt which amounted €235 million as of June 30, 2014, Imerys would maintain a very robust financial structure with a net financial debt to equity ratio below 60%, after the transaction.

The completion of this transaction remains subject to the approval of the relevant regulatory authorities and should take place during the first quarter of 2015. The Kyriacopoulos family, who would hold around 4.4% of Imerys’ shares upon completion of the transaction, has entered into a shareholders’ agreement with GBL group which would become effective as of completion date. This agreement in particular would grant to the Kyriacopoulos family the right of representation on the Imerys’ Board of Directors.

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1 Unaudited pro forma data – Source: S&B.
2 Under the authorization granted to the Board of Directors by the Ordinary and Extraordinary Shareholders’ General Meeting of April 25, 2013.
3 With no intent to act in concert.
4 Subject to the approval of Imerys shareholders at their next Annual General Meeting.
Please tell us about your business.

Keltech Energies Ltd. (KEL) is a leading manufacturer of expanded perlite in India for diverse applications, with technical collaboration with Silbrico Corp USA. Keltech has been in business for 29 years. We operate stationary perlite expansion plants at two locations in India to supply bagged perlite products to the cryogenic, construction, refractory, horticulture, steel and foundry industries and other industrial applications. We also have 10 mobile expanders with necessary auxiliary equipment to carry out site expansion and filling of perlite into cryogenic tanks. These can be mobilized to any project site along with an execution team to carry out the work and return to India after completion.

We have 30 employees who help to manufacture our perlite products. Our customers are in the cryogenic, construction, refractory, horticulture and foundry industries, and we market our business to them through direct and online marketing as well as network channels. By upgrading our systems to be more automated, we have avoided the non-availability of unskilled workers and reduced our labor overheads.

How has your business changed through the years?

We have achieved a steady growth in business with special achievement in the cryogenic application in the oil and gas sectors.

Describe your involvement with the Perlite Institute and your hopes for the association in the future.

We have been a member of the Perlite Institute for all 29 years of our company’s existence. We benefit through our membership by obtaining developments in the perlite market and application of the product. We enjoy getting to interact with other perlite manufacturers from all over the world and sharing our experiences in the manufacture and application of expanded perlite. Through the Institute, our directors have been closely involved in the development of new applications of perlite. Some have also served as president of the Institute on several occasions.* As we look to the new year, we hope that the Perlite Institute will help to develop areas for new applications of perlite.

CRYSTALLINE SILICA and DUST

The evaluation of public comments on the proposed U.S. respirable crystalline silica (RCS) allowable exposure limits is expected to be complete in June 2015. As always, some companies view new rules as an opportunity, while others view new rules as a disaster. Several companies are viewing this as an opportunity to market their “new” dust suppressants, while others are relying on their recently completed lobbying efforts to maintain the status quo.

In other news, the radiologist involved with mass filings of silicosis and asbestosis lawsuits recently lost an appeal of a $10,000 fine by the Mississippi Licensure Department. The fine had been imposed in 2012, and a lower court had agreed with Dr. Herron. Now, the Mississippi Appeals court has reversed the ruling, effectively reinstating the fine. Having dealt with lawyers in the past, perhaps it would have been a lot cheaper for him to just have paid the original fine and gotten on with his life.

GLOBAL WARMING & POLITICS

Although the United States and China agreed to eventual reductions in carbon emissions in November, the same old divisions resurfaced during the December Climate Change Conference in Lima, Peru. As developing nations, neither China (the #1 emitter) nor India (the #3 emitter) have ever been required to cut emissions, and they are not interested in any kind of oversight of their actions in the future.

I hate to harp on the subject, but money is also a factor. $10 billion has been pledged so far during this Lima conference, with $3 billion from the United States. That simply will not be enough to get nations to construct facilities necessary to achieve the needed reductions in greenhouse gas emissions.

REACH, CLP and GHS

Reminder: 2015 will have two deadlines for implementing the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) rules. By June 1, U.S. chemical manufacturers, importers, distributors and employers will be required to comply with the final OSHA rule. Distributors will have until Dec. 1 to ship goods manufactured and labeled with non-GHS compliant labels. The timeframe for implementation will vary from country to country. A summary of rules around the world is found at www.unece.org/trans/danger/publi/ghs/implementation_e.html.

Another reminder, and this time I’m also reminding myself, all MSDSs (Material Safety Data Sheets) should be renamed SDSs (Safety Data Sheets). Saying SDS instead of MSDS will feel awkward to American ears at first, but keep doing it and it will sound more natural. And, if those SDSs (see, doesn’t that feel better?) don’t have 16 sections, they won’t be compliant.

MINE SAFETY

Regardless of what we think about the U.S. Mine Safety and Health Administration (MSHA), it seems to pay to be a big violator. The agency can go after the little guys, but a little bit of investigation by National Public Radio and Mine Safety and Health News found that:

- Although 93 percent of mine operators pay their penalties, 2,700 mining company owners failed to pay nearly $70 million in delinquent penalties.

The timeframe for implementation of the Paris accords (which have not even been finalized or ratified) is another factor. The United States is pushing for accomplishing the goals over a five-year period, from 2020 to 2025, while the European Union and others are looking to accomplish goals by 2030.
Why Perlite Rocks continued from page 8

• The top nine delinquents owe more than $1 million each.
• Mines that don’t pay their penalties are more dangerous than mines that do, with injury rates 50 percent higher.
• Delinquent mines reported close to 4,000 injuries in the years they failed to pay, including accidents that killed 25 workers and left 58 others with permanent disabilities.
• Delinquent mines continued to violate the law, with more than 130,000 violations, while they failed to pay mine safety fines.

The violations at delinquent mines included 40,000 that are labeled in government safety records as “significant and substantial,” which means serious injury or illness were likely if inspectors hadn’t intervened. More than 15,000 violations were the kind found in fatal accidents, major disasters or mining deaths.

In a related story, the former CEO of Massey Energy, Don Blankenship, has been indicted on four federal charges related to the Upper Big Branch mine disaster in 2010 that killed 29 miners. The charges claim conspiracy to keep mine inspectors from doing their job to avoid fixing broken equipment or remediating unsafe working conditions and allowing high levels of airborne coal dust in the mine.

COMPETITION

Filter aid sales to small- and medium-size brewers can be expected to fall. I recently went on a brewery tour of a “craft” brewer that had purchased a centrifuge to clarify its beer. As I looked around, it was painfully obvious why. The centrifuge, with an initial cost of roughly $750,000, can handle projected volumes of production, versus the tiny plate and frame filter that the brewer had used before.

All other phases of the brewing process were overbuilt as well. Apparently, sales are able to justify the large numbers of tanks and other equipment at the facility. The onsite restaurant and banquet business revenue also contributes to the brewer’s bottom line. I learned that several other mid-sized brewers, such as Sierra Nevada and New Belgium Brewing, have also switched to the centrifuge method.

This local brewery, which produces cans and kegs only, may not be typical of an average brewer. However, the filling line gave some indication of how contamination as discussed in last quarter’s Perlite Today might find its way into the containers. Although cans are upside down some of the time in the process, other times they are right side up and the potential exists for foreign matter to fall into the cans. The paper cited last time did not follow up with visits to the brewers’ production facilities to rule out sources.

Diatomite made the news via some research at Iowa State University. The material is being tested in vacuum insulation panels and has performed well. There’s no indication yet whether the researchers have tested or will test perlite powder. Another news item involved the sale of a diatomite deposit in New Zealand, north of Dunedin.

The EPA’s final report on the Libby, Montana, contaminated vermiculite deposit has been issued after 15 years. The findings show that levels of asbestos have dropped by a factor of 100,000, returning exposures back to ambient amounts.

THE ECONOMY

It is really interesting to see how some things change over the period of a few months. Oil prices and gasoline prices are down, and the value of energy company stocks has slumped as well (perhaps an overreaction?). People are talking about the economies of whole countries collapsing due to such low prices and about the lack of resources from gasoline taxes to maintain and upgrade infrastructure as well. And yet, since consumers have more money in their pockets, sectors of the economy such as restaurants are anticipating more business.

Housing is doing well also, but I am now reading that certain areas of the United States may be approaching “bubble” levels. That’s certainly not good. Perhaps employment numbers combined with continued low interest rates can keep any bubble areas from bursting.

GREEN BUILDINGS

LEED v4 implementation has been pushed back until Oct. 31, 2016. In the meantime, LEED 2009 will still be in place. Whether the delay is due to conflicts over the use of certain plastics or whether, as the U.S. Green Building Council
Why Perlite Rocks continued from page 9

(USGBC) maintains, international implementers are not ready for its use, the fact remains that there will be a delay.

The USGBC also claims that its stance on plastics is intended to protect the public and inform people about what ingredients are parts of any plastics such as piping. Researchers at Purdue University have looked at pipes made from crosslinked polyethylene, high-density polyethylene, polyvinylchloride and polypropylene. The crosslinked polyethylene had been viewed as a “greener” alternative, but leaching tests resulted in water that failed an odor test, and one brand even exceeded allowable levels for a chemical normally intended to boost oxygen levels in gasoline. As chlorine (disinfectant) levels in the water run through pipes increased, the odor levels increased as well. The USGBC’s point would seem to be that there needs to be better disclosure of what the ingredients in plastics actually are.

The USGBC is additionally taking a look at clear plastics, such as Lucite. The use of acrylics in place of glass could be beneficial in terms of initial energy use and energy loss through windows. Long-term effects of weathering might push the balance back toward glass.

Whether or not industry is ready for such disclosure of ingredients and performance now, it may be a direction that they will have to go by late 2016.

BIOFUELS & OTHER SUSTAINABILITY ISSUES

I have historically included biofuels in this column as a field peripherally related to perlite from an energy standpoint regarding the fuel we use to dry and expand perlite, from the view that such fuels could need filtration, and from the potential for perlite to act as a carrier for organisms to interact with input raw materials and deliver useful materials. One article I’ve read has divided the world of biofuels into conventional biofuels, such as ethanol and butanol, versus oil or gasoline type materials.

The contention is that ethanol, however produced, is a relatively low-energy density material. Whether produced from sugars or cellulose, the process is considered anaerobic and not limited by the size of the equipment. These processes can be carried out in volumes of over 1 million gallons (about 4 million liters).

Research into higher energy density fuels, such as gasoline, other hydrocarbons, fatty acids or alcohols, or terpenes, is currently preferred by the Department of Energy. These materials are made in an aerobic environment. Therefore, there is a limit on the size of the reaction vessel. The volume must be properly agitated and aerated. It remains to be seen what role perlite might play in this type of process.

Biofuels also have other issues associated with them, including real-life factors such as their cost relative to the cost of petroleum-based fuels, the lost opportunity of using crops for food or returning nutrients to agricultural soils, and the cost of gathering and transporting organic materials for processing. KiOS, a wood chip to fuel venture funded in 2013 by billionaires Vinod Khosla and Bill Gates and supported by the state of Mississippi, has declared bankruptcy after having operated slightly over a year, all the while losing money from every drop of fuel it produced. And now, with the price of crude oil below $70 per barrel, not many of these ventures look too promising.

OTHER REGULATORY ISSUES

An interesting case is before the U.S. Supreme Court. At issue is whether the quasi-government passenger rail company Amtrak can set performance standards on rail lines owned and usually operated by freight companies. A 2008 law seems to allow that, and the Association of American Railroads has objected. As it stands now, the association has won the last round in the Appeals Court, so if the Supreme Court agrees, ore deliveries might come a little faster.

Additionally, there is an outside chance that U.S. Congress will get around to revising the Toxic Substances Control Act, as had been proposed in 2013. Right now, there are two competing versions, one with more bipartisan support than the other. The then-reported-on Lautenberg-Vitter bill was reintroduced in September 2014 as the Udall/Vitter Chemical Safety Improvement Act but has not gotten too far. Congress may give it some consideration during 2015.

Until next time, happy expanding! Contact me at k_wiener@hotmail.com if you have any questions.
The Perlite Papers

Innovative Uses of Perlite Explored

by Kenneth Wiener

I try to put new research ideas into this column. Papers that analyze the mathematics of another material adsorbed on perlite or report on another phase change material absorbed into a mass of perlite to provide an insulation material just don’t interest me. Admittedly, though, there are areas in which extra papers build a base of knowledge that may get exploited commercially.

One such area is synthetic zeolites. Only a few companies are manufacturing materials in that field. If any Perlite Institute member wants me to research and/or explain these papers, I would be happy to do so. The various researchers generally add strong bases to expanded or unexpanded perlite at elevated temperatures for extended periods of time. We can all agree that this type of process is beyond the realm of possibility for most perliters.

Chemistry on Perlite Surfaces

References 1 and 2 pertain to the fact that the only surface chemistry on standard perlite is hydroxyl (OH−) groups. About the only thing that’s good for is adding silanes, silicones or other such coupling agents. Both papers discuss affixing active chemical sites onto perlite surfaces. The Kolvari, et al. paper confused me a bit at first because of the use of the word “catalyst.” As I read more of the paper, it became clear that the covalently bonded acid-coated surface was doing a wonderful job creating high purity, large organic molecules from smaller molecules at relatively low temperatures and in a short amount of time. The authors compared several syntheses using sulfonated perlite to the same reactions using other catalysts, and the perlite came out on top consistently.

The Blaskov, et al. paper uses another mechanism, called spray pyrolysis, to put chemistry on the surface of perlite, this time, silver (probably in the form of nanoparticles). Those researchers too report high efficiency for the decomposition of ozone. Think about this as reducing smog in the lower portion of the atmosphere, rather than affecting the ozone levels (or holes) in the upper atmosphere.

While neither of these chemical modifications of perlite are likely to be carried out in any perliter’s facility, other surface modifications could be. Incidentally, I am currently working on a couple of ideas, which will be within the capability of the average mining company or expander.

Insulation

References 3 and 4 deal with something that’s relatively well known within our industry but deserves to be mentioned again: Parts made with perlite provide insulation. In the case of Abidi, et al., the testing was performed with panels made with (by volume) one-third plaster, one-third perlite and one-third vermiculite; fire protection was the goal.

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Sound insulation or isolation was the goal of Zhao, et al. The perlite they used had a bulk density of about 80 kg/m³. They found that of the three materials tested, perlite had the best sound absorption coefficient but created concrete that was too light. So, they created blocks of concrete with lightweight slag in the bottom layer and perlite in the top: 8 cm of slag concrete and 12 cm of perlite concrete worked out well from a theoretical and practical standpoint. Interestingly, the sound reduction varied, based on the speed that the train was going when it passed over the concrete (from 2.5 dB at 80 km/h to 4 dB at 200 km/h).
Zhao, et al. were not the only researchers to use a two-layer system. Reference 5 uses a 150 mm layer of perlite (190 kg/m³, 0.3 – 1.0 mm) on top of sand to filter out roughly 1 micron sized aerosol particles from air. Pressure drops took much longer to develop with the dual layer system, and the efficiency of filtration was improved.

And lastly for this issue, Reference 7 is another article about something that is quite doable: using perlite as a filler to create syntactic foam with aluminum. As far as I can tell, the main conclusion is that 1 mm or so perlite is better than 5 mm perlite.

I continue to look forward to reading about and reporting on innovative thinking out there in both the literature and the real world.

References:
The U.S. patents involving perlite granted and published during September through December is down again, after two impressively productive quarters.

Halliburton received the highest number for any individual assignee, and the usual suspects such as Clariant and James Hardie Technologies were represented as well. The use of perlite, both expanded and unexpanded, is taught in several Halliburton patents.

However, a patent granted to the U.S. Department of Agriculture teaches the opposite of a patent granted to a company based in the Netherlands. The Dutch company wants to find microbes in a sample by attaching them to a surface. Microbes did not stick to perlite when they tested it, perhaps, as they say, because of the negative electrical charge on perlite’s surface. When pregelatinized wheat starch was added to perlite by researchers working for the Department of Agriculture, microbes stuck. Those researchers did not mention the charge on the starch.

Keen readers of this column may remember a patent granted to Mr. Lambert on biophysical geoengineering. As you can read in the patent list on this page, he couldn’t stop at just one. There’s another one in the works as well. Perlite meets his needs for something that floats, is white in color and has a high reflectivity.

Even if none of the listed patents generate any sales for Perlite Institute members, they keep pushing the boundaries of perlite thinking, production and applications. Thanks for continuing this journey with me.

### Perlite Patents in Last Quarter of 2014 Are Down

<table>
<thead>
<tr>
<th>Patent Number(s)</th>
<th>Date Issued</th>
<th>Inventor(s)</th>
<th>Assignee(s)</th>
<th>Topic</th>
<th>Role of Perlite</th>
<th>Perlite: Innovative/Old Technology</th>
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<td>8,832,236</td>
<td>7-Oct-14</td>
<td>Haintze, et al.</td>
<td>HCH Spolka (PL)</td>
<td>Shaped construction elements</td>
<td>involoves pressoaking in water</td>
<td>Perlite: Innovative/ Old Technology</td>
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<td>8,832,231</td>
<td>7-Oct-14</td>
<td>Gerritse, et al.</td>
<td>NOVTRNO (NL)</td>
<td>Microbial contamination detection system</td>
<td>adsorbent for microbes</td>
<td>Not preferred, possibly due to negative surface charge</td>
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<td>8,852,036</td>
<td>21-Oct-14</td>
<td>Papaganakis</td>
<td>NOVTRNO (NL)</td>
<td>Microbial contamination detection system</td>
<td>core for particles</td>
<td>Perlite preferred</td>
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<td>8,858,531</td>
<td>21-Oct-14</td>
<td>Imam, et al.</td>
<td>US Agriculture Dept.</td>
<td>Bioactive starch composition</td>
<td>absorbent for starch</td>
<td>Base for starch and microbes</td>
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<td>8,877,439</td>
<td>4-Nov-14</td>
<td>Turbeville, et al.</td>
<td>Crane Co.</td>
<td>Metal-treated particles</td>
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<td>8,882,531</td>
<td>4-Nov-14</td>
<td>Roddy, et al.</td>
<td>Halliburton</td>
<td>Weighted elastomers</td>
<td>preferred ingredient</td>
<td>Preferred ingredient</td>
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<td>8,882,525</td>
<td>11-Nov-14</td>
<td>Lambert</td>
<td>-----</td>
<td>Biophysical geoengineering</td>
<td>preferred ingredient</td>
<td>Important part of invention</td>
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<td>8,882,236</td>
<td>16-Dec-14</td>
<td>Chatterji, et al.</td>
<td>Cememting compositions</td>
<td>Cement kiln dust</td>
<td>Pozzolan, lightweight</td>
<td>Unexpanded perlite mainly</td>
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<td>8,895,486</td>
<td>9-Dec-14</td>
<td>Chen, et al.</td>
<td>James Hardie</td>
<td>Cememting compositions</td>
<td>Pozzolan, lightweight</td>
<td>Commonly used material</td>
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**Patents:**
Two Thumbs Up for Perlite

*by Kenneth Wiener*
Q: I am doing some research about the process or possibility of regenerating expanded perlite, which we use for insulation and as a desiccant in a high-vacuum system. After the perlite has been exposed to atmosphere after having been pumped down using heat to a high vacuum, may that same perlite again be returned to an uncontaminated state by using heat and vacuum, or has the perlite been “used” up? If so, what would be the adequate temperature and vacuum needed to achieve the desired goal?

A: Perlite is an inert expanded silica. It does not act as a desiccant and absorb. It is used as an insulator, much like millions of small double-pane windows, and it can remain that way indefinitely. There are conditions within structures that leak and thereby cause wetting of the perlite. In cryogenic applications, when the perlite is removed, it is discarded if it has become wet. Dry material is often stored and then refilled into the container after repairs are made. The excavation of the perlite can be done either by gravity or vacuum. The key in removal is to minimize breakdown during this procedure. When the material is conveyed too fast in the line, there is always some nominal breakdown, which is why units are topped off after refilling with some new cryogenic perlite.

Q: I am working on a project of an industrial plant of nitrogen and oxygen liquid. Do you have information about the behavior of the thermal conductivity of perlite between the temperature of -196 degrees C and +200 degrees C?

A: Expanded perlite has been used for many, many years in the cryogenic area due to its great insulating and inert properties. The Perlite Institute has produced two bulletins that provide basic information in the range you have listed:

Evacuated perlite – wide range of temp: http://tinyurl.com/EvacuatedPerlite
Cryogenic information – nonevacuated perlite: http://tinyurl.com/PerliteNonevacuatedCryogenic

Q: I’ve been doing sand-based glass fiber reinforced concrete (GFRC) for some time and recently discovered perlite as an option for replacing sand to cut weight. I have a good GFRC with sand recipe I’m currently using, but I am wondering if you could recommend a recipe that uses perlite.

A: You are in luck in that we revised one of our bulletins on this very subject. Please check out “Overview of Perlite Concrete” at http://tinyurl.com/PerliteOverviewofConcrete.

Q: Can perlite be used to backfill and insulate around buried pipes? Will the perlite degrade if placed below grade? Does the perlite have to be placed with the bags or can the bags be emptied out around the pipe?

A: Perlite concrete is often used around pipe installations. Also, perlite is used as an underslab insulation. It is normally put into place in bags; however, a few do it in bulk. With buried pipes, it seems that bulk-like sand would be appropriate. Perlite is an inert substance, but it is fragile since it is glass bubbles. If there is no pressure or work done to it, it remains relatively stable.

The Perlite Institute has produced two brochures on this subject:

Perlite Concrete Insulating Underground Pipe Ducting: http://tinyurl.com/PerliteInsulatingUndergrPipe
Perlite Underslab Insulation: http://tinyurl.com/PerliteUnderslabInsulation

Want to see more? Have your own question for Chuck Vogelsang, the Perlite Institute’s technical spokesperson?

Visit the Perlite Institute Facebook page at http://tinyurl.com/Perlite-Institute-Facebook or the LinkedIn Group at http://tinyurl.com/Perlite-Institute-LinkedIn or email techadvice@perlite.org.
### Selected Upcoming Trade Shows and Meetings

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<td>2/6/2015</td>
<td>World of Concrete</td>
<td>Las Vegas, Nev. Las Vegas Convention Center</td>
<td><a href="http://www.worldofconcrete.com">www.worldofconcrete.com</a></td>
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<td>2/10/2015</td>
<td>2/12/2015</td>
<td>World Ag Expo 2015</td>
<td>Tulare, Calif. International Agri-Center</td>
<td><a href="http://www.worldagexpo.com">www.worldagexpo.com</a></td>
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<td>2/18/2015</td>
<td>2/19/2015</td>
<td>National Concrete Masonry Association</td>
<td>San Antonio, Texas Hyatt Hill Country Resort</td>
<td><a href="http://www.ncma.org">www.ncma.org</a></td>
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<tr>
<td>2/24/2015</td>
<td>2/26/2015</td>
<td>Filtech</td>
<td>Cologne, Germany Koelnmesse</td>
<td><a href="http://www.filtech.de/">www.filtech.de/</a></td>
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