Newsletter

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How time flies…
The GBA Laboratory Group Celebrates 25 Years

by Sabine Gerkau, Carsten Schaffors, GBA Laboratory Group

This year, the GBA Laboratory Group reaches a major milestone. Twenty-five years ago, on June 27th 1989, the GBA Laboratory Group was founded in Hamburg-Harburg by Dr. Dr. Erich Döllefeld, laboratory doctor and chemist. In those days, Dr. Dr. Döllefeld ran a practice for laboratory medicine in Harburg. Due to the changing demands, he decided to separate the chemical analysis part from the medical analysis practice in order to meet the market demands for this field as well. The spectrum of analyses comprised the fields of food and environmental testing. This was later expanded to include consumer goods and pharmaceutical analysis. Having begun with seven employees and 450 sq.m. of laboratory space, the business continued to develop over the years.

"Today we can proudly view a group of companies that has demonstrated healthy development within the last two and half decades, with approximately 15,000 sq.m. of laboratory space and about 400 employees," said Manfred Giesecke, Managing Director and stakeholder. Over 25 years, one small laboratory has turned into 9 sites throughout Germany. Although there have also been a few hurdles to jump over along the way, Dr. Dr. Döllefeld and Mr. Giesecke both agree on their motivation: "We have always followed our vision, have believed we could succeed, we took advantage of opportunities, and together with our employees we have worked hard to come to this point."

We would like to share our success with other people, and we have decided not to do that in the form of a big celebration. As was the case on several occasions in the past, the GBA Laboratory Group would like to use its anniversary as an opportunity to highlight its philanthropy. That's why we donated the total sum of € 15,000 to the Open Kitchen Foodshare of Hamburg, Munich, Gelsenkirchen, and Hannover. The Open Kitchen Foodshare of those cities collect food donations of contributors and sponsors and share them out to people or social institutions with food distributions. "With this initiative, we would like to make people happy," said Manfred Giesecke "who, because of different fatalities, are dependent on others' help." "Social responsibility was always a major issue at GBA," explained Dr. Dr. Döllefeld "and we are delighted if we can help as many people in this way. That way they might participate a little bit as part of our success the past 25 years."

Last but not least, the successful development of the GBA Laboratory Group is due to the many clients who we have had the privilege of working together with over so many years. At this point, we would like to take this opportunity to thank you for your trust and loyalty. In the future, we will continue to make it our goal to be a competent and dependable partner for all of your analytical service needs and inquiries, so that we may celebrate many more anniversaries together in the future.

HAMBURGER TAFEL e.V.

MÜNCHNER TAFEL e.V.
Lebensmittelspenden für Bedürftige

Hannöversche Tafel

gelsenkirchener tafel e.V.

Rare Earth Elements:
Decomposition, Problems and Perspectives

by Carsten Schaffors, GBA Laboratory Group

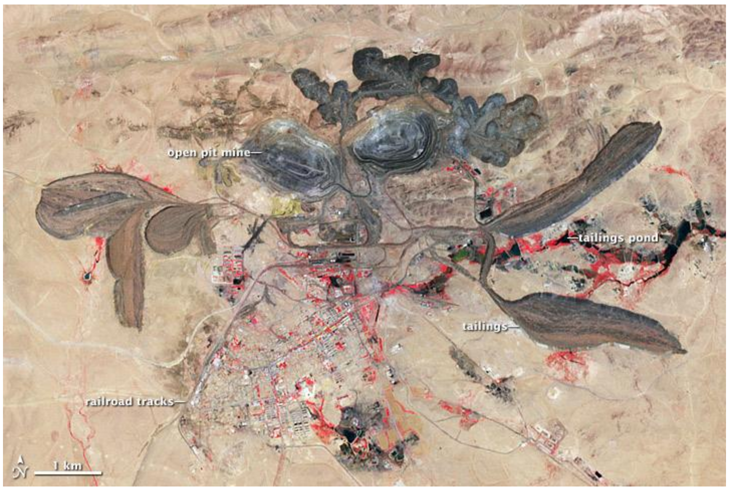
The economic significance of the commodity group of rare earth elements has increased massively over the past few years. It is mainly used in military technology, high-tech electronics, metallurgy, optics, and environmental technology. In most cases, only a very small amount of rare earth elements is used in this diverse array of products, however, due to the military usage, this commodity group has also gained a strategic importance. [1], [2] In many applications, rare earth elements cannot be replaced by other raw materials, so presumably the range of applications for it will continue to expand.

Example applications for rare earth elements: [1], [2]

Military technology:	Guided missiles, radar, armor plating, satellites, high-performance permanent magnets (based on samarium-cobalt (SmCo) or neodymium-iron-boron (NdFeB)).
Electronics:	Hard drives, DVD and MP3 players, plasma and LCD screens, fiber-optic cables, lasers, ceramic capacitors, high temperature superconductors.
Metallurgy:	Used in alloys, Ni-MH batteries.
Optics:	Used to cut and polish high-precision lenses.
Environmental technology:	Catalysts, high-performance permanent magnets (e.g. for hybrid and electric motors), wind-power turbines, energy-efficient light bulbs, electric motors.

A total of 17 metals belong to the rare earth group. In addition to the lanthanides, which follow lanthanum in the periodic table, lanthanum itself belongs to the group, as well as yttrium and scandium. The group of light rare earth elements (the cerium group) comprises lanthanum (La), cerium (Ce), praseodymium (Pr), neodymium (Nd), samarium (Sm), and europium (Eu). [2], [4] In most deposits, these elements are usually found at a rate of over 90%. The heavy rare earth elements include yttrium (Y), gadolinium (Gd), terbium (Tb), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb) and lutetium (Lu). [3], [4] They only make up a concentration of about 4% of the total in most deposits. Scandium (Sc) is formed under other conditions and in most mining areas it is not considered one of the economically relevant rare earth elements. [3] Promethium does not occur naturally, since it is radioactive and only forms short-lived isotopes. [3], [4]

Contrary to what one would assume from its name, rare earth elements are not "rare." Copper, lead, and tin, for example, are more scarce than the more common rare earth elements. Thulium and lutetium, the "rarest" of rare earth elements, still occur 200 times more frequently than platinum and gold. [5] There are, however, only a few locations in the world where these metals can be found in concentrations that make mining activities economically viable. [1], [2] Rare earth elements can only be extracted together, and often only as a byproduct in the mining of iron ore, heavy minerals, and tin ore. The metals that are chemically similar to rare earth elements come in compounds with carbonates, oxides, phosphates, and silicates, in rock-forming minerals such as bastnaesite, monazite, xenotime, as well as ion adsorption clays. [6] Bastnaesite represents the most significant source of rare earth. 97% of the worldwide production of rare earth elements come from China, mainly from the deposits in Bayan Obo (Inner Mongolia) and in the Sichuan province (both of which are bastnaesite deposits), as well as from southwest China, where they are formed in deposits with ion adsorption clays. [1], [6] In 2010, the demand for rare earth elements was estimated at about 136,100 tons. In contrast, the worldwide production was about 133,600 tons. [2] By 2016, the worldwide demand will be an estimated 160,000 tons.



The map shows Bayan Obo in 2006. NASA Earth Observatory, http://earthobservatory.nasa.gov/IOTD/view.php?id=77723, 28.07.2014.

Based on past and present explorations, the worldwide reserves are estimated at 99 million tons (t), divided between China (ca. 37%), CIS nations (ca. 20%), USA (ca. 13%), India (ca. 3%), Australia (ca. 5.5%), and other nations (ca. 22%). [1] Despite the various applications, the market for rare earth elements in worldwide trade is still relatively small, with a total revenue of about $2 billion currently. [4]

With the expected rise in demand, it is assumed that the total amount produced in China (in 2011 it was 105,00 t and an increase in production to about 130,000 t is expected by 2016) [2] will also almost entirely be consumed within China. [1], [4] Thus, the production cannot only increase in China. New deposits must be discovered and new technology must be developed, for example, for gathering the rare earth elements from the waste water of production processes. [1]

In the southern provinces of China, about half of the production of heavy rare earth elements, approximately 20,000 t per year, is gained from illegal mining. The measures that the Chinese government took against these actions, which were meant to prevent serious environmental impacts, also caused the prices for rare earth to increase significantly, which then consequently gave extra incentive for the illegal mining activities. [3], [7]

In addition to China's nearly monopolizing position in production and processing, there is also the risk that a stable market supply cannot be ensured. Furthermore, market manipulations in price and amount cannot be ruled out. In March 2012, the U.S. Administration filed a World Trade Organization (WTO) case against China citing unfair trade practices on the rare earth market. [2] Social unrest and natural catastrophes in the mining regions pose further risks that might affect the world market. [1] For these reasons and because of the strategic significance of rare earth elements, further deposits should be discovered or reactivated, for example at Mountain Pass in California (starting this year, 19,000 t per year should be extracted [2]), Pitinga in Brazil, and Dubbo in Australia. [3],[4]

In Europe, rare earth elements are currently only being mined in Russia, on the Kola peninsula. One of the largest sources of rare earth elements is in Kvanefjeld, in the south of Greenland. Its extraction is planned as a byproduct of uranium mining and should be implemented by 2020. [3],[4] Based on the geological situation, rare earth elements only occurs in very limited amounts in Germany. Currently there are projections of an estimated 41,600 t of rare earth near Delitzsch, Saxony, spread over a 100 sq. km area. [6] More recent investigations resulted in scandium findings of mentionable concentrations in the eastern Ore Mountains (Erzgebirge). In Baden-Wuerttemberg, there are speculations that the there found "Koppit-Marble" contains 3% lanthanides, and there are further possible deposits in the Harz region of Lower Saxony and Saxony-Anhalt. [6] Whether mining in this region would ever be economically viable cannot be predicted at the moment. Usually, the minimum amounts for mining to be considered viable at a certain location are about 1 million tons of rare earth elements or 300,000 t of heavy rare earth elements. [3]

Residue from the mining of rare earth elements can harm the environment. In general, polluted waste water is collected in artificial ponds, which then contain poisonous and/or radioactive waste such as thorium, uranium, heavy metals, acids, and fluorides. [7] Radioactive substances could then be spread by air or water. Since breaches in the dams which hold these artificial ponds might also occur under certain circumstances, the potential danger is even more threatening. Most of the time, newer projects outside of China already take environmental protection systems into consideration, however, the mining company that is interested in mining uranium and rare earth elements in Greenland, for example, is planning to store the hazardous waste in a natural lake with an influx to the sea. [7]

The expected bottlenecks in the supply and the high prices offer incentives to consider more efficient usage, alternatives, and recycling systems in Europe. [7] A secondary production industry in Europe would bring with it a corresponding effect on the environmental protection systems, along with greater independence from foreign suppliers and a build-up of knowledge about the processing. Furthermore, no radioactive waste arises from production from recycling. Those are also arguments for promoting such efforts in the economy.

The analysis of rare earth elements has been part of the GBA Laboratory Group's analytical spectrum for several years. We were approached with questions about methods of disposal in mining quite early, so we have been able to build up the necessary experience and know-how. We will also continue to inform you about further developments in this market.

Feel free to contact us about this topic:

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Literature:

[1] „Rohstoffkonflikte nachhaltig vermeiden: Risikoreiche Zukunftsrohstoffe? Fallstudie und Szenarien zu China und Seltenen Erden (Teilbericht 3.4)“, *Forschungsbericht UBA-FB 001478/3.4 des Umweltbundesamtes, Fachgebiet I 1.2, April 2011*

[2] „Rare Earth Elements: The Global Supply Chain“, *CRS Report for Congress, Marc Humphries, Congressional Research Service, December 16th 2013*

[3] „Kritische Versorgungslage mit schweren Seltenen Erden - Entwicklung „Grüner Technologien“ gefährdet?“, *Commodity Top News Nr. 36, DeutscheRohstoffagentur (DERA) in der Bundesanstalt für Geowissenschaften und Rohstoffe (BGR), September 14th 2011*

[4] „Seltene Erden“, *Commodity Top News Nr. 31, Bundesanstalt für Geowissenschaften und Rohstoffe (BGR), November 20th 2009*

[5] „Seltene Erden“, *Mineralienatlas Lexikon, www.mineralienatlas.de*

[6] „Seltene-Erden-Rohstoffe in Deutschland“ *Kurzbericht der Ad-hoc-AG Rohstoffe des Bund-Länder-Ausschuss Bodenforschung (BLA-GEO), November 8th 2010*
[7] „Seltene-Erden - Daten & Fakten“ *Hintergrundpapier Seltene Erden des Öko-Institut e.V., Stand: Januar 2011*

We Cordially Invite You To: The COTECA 2014 Trade Fair in Hamburg September 24th – 26th, Hall A4, Stand 123

by Sabine Gerkau, Carsten Schaffors, GBA Laboratory Group

It's that time once again. The COTECA Global Industry Expo takes place in Hamburg every two years. From Wednesday, September 24th, to Friday, September 26th, the Hamburg expo will open its doors for all international participants in the coffee, tea, and cocoa markets. Here the focus is on the entire processing in these fields, from the harvest all the way to the delicacy of the final product. Furthermore, the expo also deals with the significance of the necessary technology and the most important services in this field.

The GBA Laboratory Group will present itself at COTECA in the service field, or more specifically, the analytical service field. We cordially invite you to visit us at our stand number 123 in Hall A4 and to get information about our product portfolio and services.

Furthermore, Dr. Schuett, our resident tea and coffee expert at GBA, will be holding a special presentation at the accompanying COTECA conference. The general topics for the morning of Thursday, September 25th, are quality control, transparency, and product safety. At 12:15 p.m., Dr. Schuett will present on the analytical technology as an integral part of the quality assurance process, particularly with regards to the synergies between the producer, the laboratory, and the traders.

Over the years, COTECA has developed into an international meeting point for the industry. We are looking forward seeing you at the expo and having interesting conversations!

You are welcome to contact us about this topic:

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KNOW WHAT'S INSIDE ...

GBA
GESELLSCHAFT FÜR BIOANALYTIK MBH

Beer Can Chickens: A Questionable Preparation Method

by Carsten Schaffors, GBA Laboratory Group

Various cooking recipes found online or on TV describe how to grill a chicken by placing it on a beer can. In the announcement 024/2014 from July 1st 2014, the German Federal Institute for Risk Assessment (BfR) advised against this method of preparation, since the printed exterior and the coated interior of the aluminum or tin container may release hazardous substances when heated in the process of grilling or baking. [1]

Since only the exterior of the can is printed and the substances contained within the inks do not transfer to the food product under normal usage, the draft of the German regulations for inks printed on consumer food products does not list any limitations on the inks used in this case.

When utilizing the can in a non-standard way, grilling or roasting a chicken on top of the can, the fat that is released comes in direct contact with the exterior of the can and this can facilitate the transfer of substances into the food product which will be consumed. Additionally, decomposition products from the ink substances or the coating can be generated by the high temperatures, because the cans were not constructed for that either in their original purpose. Thus, when used in this way, potentially hazardous substances could be generated and consumed by humans.

The investigation of various questions regarding the analysis of consumer goods is among the GBA Laboratory Group's core competencies. If you have questions about your product, then please, feel free to contact us.

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Literature:
[1] „BfR rät vom Bierdosen-Hähnchen ab", *Mitteilung Nr. 024/2014 des BfR, 01. Juli 2014*

Inquiries or orders can be directly placed at this or any other of our locations:

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