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TANTALUM-NIOBIUM INTERNATIONAL STUDY CENTER

PRESIDENT'S LETTER

I would like to thank everyone who attended the General Assembly in Lisbon. The Technical Sessions were excellent. The presentations were of the highest quality, which is what we've come to expect from this organization. I would especially like to thank the people of EPCOS for being the host company and arranging the tour of their facility in Évora as well as phenomenal sightseeing in and around Lisbon. Based on comments from many delegates, the Gala Dinner at the Coach Museum will be remembered for many years to come.

On behalf of the T.I.C., I would like to thank Dr Josef Gerblinger for his involvement and guidance as President last year. Serving as President and being organizer for the host company is a tremendous task. His hard work and leadership resulted in a most memorable General Assembly.

The Forty-fifth General Assembly will be held at the Sheraton Society Hill in Philadelphia, PA as part of the meeting from October 10th-12th 2004. Reading Alloys in Reading, Pennsylvania has graciously agreed to host a plant tour for delegates.

It is certainly not too early to begin thinking about technical papers for next year's meeting. As always, we intend to present highest quality papers to cover the broad range of interest of our members.

I wish you all a safe and happy holiday season and a prosperous 2004.

Dave Reynolds
President

CONTENTS

FORTY-FIFTH GENERAL ASSEMBLY

The next General Assembly meeting will be held in Philadelphia from October 10th to 12th 2004.

A plant tour of Reading Alloys will be a feature of the programme.

MEETING IN LISBON

The Forty-fourth General Assembly was held in Lisbon, Portugal, on October 13th 2003. The technical presentations, together with a tour of the EPCOS plant at Évora, a cocktail reception to open the meeting, sightseeing activities in Lisbon, Évora and Monsaraz, and a Gala Dinner at the Museu dos Coches completed an excellent programme from October 12th to 14th.

GENERAL ASSEMBLY

Dr Josef Gerblinger chaired the Assembly, at the end of his year as President. He has been very active, driving forward the business of the association as well as organising the plant tour of his company's factory, EPCOS in Portugal.

Mr David Reynolds, KEMET, was elected President for the year to October 2004.

Mr John Linden, Mr Peter Maden and Mr Yeap Soon Sit retired from the Executive Committee, and the association is most grateful to them for their many years of service to the organisation. Mr He Jilin, of Ningxia Non-ferrous Metals, and Mr David Paull, Sons of Gwalia, were elected to membership of the Executive Committee. Mr Tadeu Carneiro, Dr Gerblinger, Mr Michael Herzfeld, Dr Axel Hoppe, Mr William Millman and Mr Thomas Odle were re-elected as members.

Six companies were elected to membership of the association, see Member Company News for their names. Since July 1st 2003 six companies have resigned from membership. The General Assembly approved the audited accounts for the year ended June 30th 2003, and carried out all the necessary administration of the association. A working group on the transport of raw materials with naturally-occurring low levels of radioactivity was being formed under the aegis of the T.I.C.

Mr C. Edward Mosheim retired from the position of Technical Promotions Officer after serving for four years: the association thanked him for all his diligent work in this role. He presented a technical paper reviewing the statistics of the T.I.C. and recent industry news, and his work on the data over the past year is printed in this issue of the Bulletin.

Mr William A. Serjak succeeded Mr Mosheim in the technical post, and the association welcomed him to his new situation.

Further papers from the technical programme will be reprinted in the next issues of the Bulletin.

PLANT TOUR: EPCOS

More than one hundred delegates toured the capacitor factory of EPCOS in Évora, and were most impressed by the highly automated equipment which produces capacitors tested for

100% reliable quality. The staff of the plant were most welcoming and proved highly informative guides, and the T.I.C. is most grateful to everyone for this extremely well organised tour, especially President and CEO Mr Jose Vale Afonso who oversaw the entire operation.

TOURS

On Monday October 13th the group of those accompanying the delegates visited the city of Lisbon, seeing sights which ranged from the Moorish Alfama district to the modern aquarium in the park arranged for the recent Expo.

Their tour on Tuesday took them to the Alentejo region, to the UNESCO heritage site of the historic town of Évora, and to the tiny village of Monsaraz perched high on a rocky outcrop overlooking the river which forms the Spanish border, soon to become a huge reservoir. The delegates who toured the plant in Évora also visited the town and spent time in Monsaraz, where an intricate treasure hunt activity including ancient games was arranged, drawing our attention to the details of the village houses when we could be distracted from admiring the beauty of the view.

All four groups, by an amazing feat of timing, met for a lunch of typical Portuguese dishes at the Convent of Ourada.

GALA DINNER

The Gala Dinner in the Carriage Museum of Lisbon, hosted by EPCOS and the T.I.C., was, as Mr Reynolds notes, the highlight of the social events and most memorable. The tables were set among the exhibits – resplendent coaches and carriages with their own history of royal and noble owners – sparkling with candlelight. Music from the 17th century was played and we were entertained by elegantly costumed ladies and gentlemen who performed baroque dances.

MRI – MAGNETIC RESONANCE IMAGING

by William A. Serjak, Technical Promotion Officer to the T.I.C. from October 2003

NOBEL PRIZE WINNING DISCOVERIES NEED NIOBIUM

On October 6th 2003, while some of us were en route to the General Assembly in Lisbon, the Nobel Assembly awarded the Prize in Physiology or Medicine for 2003. The prize was shared by Paul C. Lauterbur and Peter Mansfield for their discoveries concerning 'magnetic resonance imaging'. Dr Lauterbur 'discovered the possibility to create a two-dimensional picture by introducing gradients in the magnetic field'. By analysis of the characteristics of the emitted radio waves, he could determine their origin. This made it possible to build up two-dimensional pictures of structures that could not be visualized with other methods. Dr Mansfield showed how the signals could be mathematically analyzed and how extremely fast imaging could be achieved.

MRI is a safe and non-invasive scanning technique that uses a magnetic field, radio waves and a computer to produce two- or three-dimensional images of soft tissue in the human body. The 'M' in MRI stands for Magnetic. The major component of the scanner machine is a very large and powerful magnet with a horizontal tube running through it. The tube is the bore of the magnet. The patient, lying on his or her back, slides into the bore on a special table for the examination. Today's magnets for MRI are up to 2.0 tesla in strength and stronger ones, up to 60 tesla, are used in research. The magnets measure 2 m by 2 m by 3 m and are constructed of niobium/titanium superconducting wire in carefully designed solenoidal coils.

The 'R' is for resonance. The resonance is achieved by applying a radio frequency pulse on the non-cancelled protons in the body. The resonance of the protons is different depending on the tissue being imaged. Thus, with some sophisticated mathematics, it is possible to slice the body into thin 'bread-like' slice images.

MRI is so useful because it is non-intrusive, exposes the body to no radiation and will allow for visualization beyond any other technique. Already, it is being used for diagnosis of multiple sclerosis (MS), tumors of the pituitary gland and brain, infections in the brain, spine and joints, strokes in their earliest stages, epilepsy and many other medical problems.

The key to MRI is the magnet and the key to the magnet is superconductor wire. Without superconductor magnets the production of high gauss MRI magnets would not be possible.

Superconductivity was first discovered in 1911 by the Dutch physicist Onnes. He observed superconductivity in mercury in liquid helium (4°K). By 1962, scientists at Westinghouse had developed the first commercial superconducting wire, an alloy of niobium and titanium. After 40 years, niobium-titanium is the leading commercial superconductor wire for MRI.

Niobium-titanium alloy wire is the wire of choice because it is cold workable: it can be made in very small diameters and drawn in long lengths. Another benefit is that it matches the physical properties of copper, which is used in the matrix to draw the wire. All these properties have made niobium a key part of a practical and commercial solution to a medical breakthrough that has greatly benefited our lives.

TANTALUM AND NIOBIUM: ANNUAL REVIEW OF STATISTICS

by Mr Ed Mosheim, Technical Promotion Officer of the T.I.C. (to October 2003), presented at the General Assembly meeting in Lisbon, October 13th 2003

INTRODUCTION

The Tantalum-Niobium International Study Center collects industry statistics from the member companies of the organization every six months. The data are consolidated to track mining and raw material production, processing of raw materials into saleable products, and shipments of these niobium and tantalum products in various forms, including chemical intermediates. The consolidated data are reported back to the member companies. The member companies have been categorized into those who 'must report' their data before the consolidated numbers can be released, and those who have been asked to report their data, but whose reports are not essential, their lack of reporting will not hold up the release of the data. Reports are collected, and then reported on a consolidated basis, by an independent auditing company.

During the last two reporting periods, that is from July 1st through December 31st 2002, and from January 1st through June 30th 2003, a company in the 'must report' category has not released any data to the independent auditor. As a result of this situation, estimates have been made based on data reported by capacitor manufacturers with input from various members of the Executive Committee. The statistics can not be released for any category unless all the 'must report' companies provide data for that category.

It is therefore necessary to keep in mind that the data for the last two reporting periods (six months each) are estimates while all data prior to July 1st 2002 are the actual consolidated data as shown previously.

The estimates of statistics for tantalum were based on the actual collected data for capacitor manufacturers' receipts of tantalum powder and wire. The U.S. import and export data were also used. For niobium, the statistics estimates were based on previous production and shipment data as well as reported trends in specific industries.

It is also important to note that the niobium and tantalum statistics are presented in graphical form with the quantities designated either as pounds of the contained metal or as pounds of contained metal oxide. The Y-axis label on each graph provides this information along with the definition of the units, shown in parenthesis. The estimated data for the last six months, January 1st through June 30th 2003, are shown as a six month statistic (and have not been doubled to approximate to a figure for the full year).

TANTALUM RAW MATERIAL PRODUCTION

Tantalum-bearing minerals are found predominantly in Australia, the tin belt of Southeast Asia, Brazil, Canada, and in a number of countries in central Africa. Resources also occur in a number of areas in China, the former Soviet Union, and more recently, some attention has focused on the potential for mining ventures in Greenland, Finland, Egypt, and Saudi Arabia. In former times, Thailand and Malaysia were the source of high-grade tin slags containing 4 to 15% tantalum oxide. The source of this past resource was cassiterite concentrates, the oxide of tin, which frequently is 'contaminated' with niobium and tantalum minerals. Demand for niobium and tantalum during more recent years has caused those minerals to be recovered for sale before the tin ores were smelted, rather than leaving them in the slag as in the past. Tin slag sources can account for up to 500 000 pounds of contained tantalum oxide per year, but depressed prices in the tin industry have minimized the availability of tantalum and niobium values from those sources.

The only high-volume hardrock mining operations are the Sons of Gwalia mines, namely the Greenbushes Mine located in southwest Western Australia, and the Wodgina Mine, located in the north of this same state. These two active producers are the largest in the world. Capacity expansions have taken place over the last two years bringing production levels up to a projected capacity above 3 million pounds of tantalum oxide per year (based on data from a three month period). Current production is at a rate of about 2.1 million pounds of contained tantalum oxide per year. All other mining operations are processing materials at less than 250 000 pounds per year of tantalum oxide as a mineral concentrate.

The production of so-called 'coltan' in the central African countries of Democratic Republic of Congo, Rwanda, Burundi, and Uganda appears to be at a low level due to the drop in demand plus the focus of attention on the illegal mining inside National Park areas by miners that were under the control of renegade militias. Reliable data on production from those areas are not available.

In Figure 1, collected data end with the six month period to June 30th 2002. A total production of about 1.7 million pounds of tantalum oxide from tantalite and tin slag was documented for that period with the second six months of 2002 estimated at almost 1.7 million pounds, followed by an estimate of 1.6 million pounds for the first six months of 2003.

The reported raw material production has remained in this area since about 1999. The tantalum oxide content of (reported)

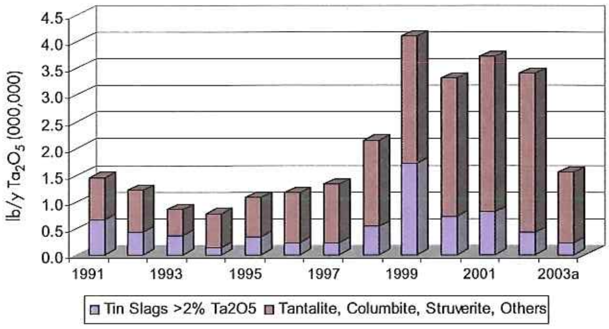

Figure 1: Tantalum raw material production

tantalite production reached about 2.6 million pounds in the second half of 2001. Tin slag as a resource is expected to add between 450 000 and 500 000 pounds of contained tantalum oxide on a yearly basis as long as dump areas are accessible to recovery of low grade material which is probably in the range of 2.0 to 2.5% tantalum oxide content.

Raw materials from non-member companies received by trading companies which are T.I.C. members are also included in the data as they are reported by those trading companies.

TANTALUM PROCESSORS' RECEIPTS

Tantalum processors' receipts (Figure 2) are reported from two different sources. One is mineral concentrates plus tin slag, and the other is secondary sources containing tantalum, such as chemicals, scrap, ingot, etc. or any other tantalum-bearing material that is considered feedstock by a processor. Both categories can include receipts from member and non-member companies, as the material is reported by the processing company.

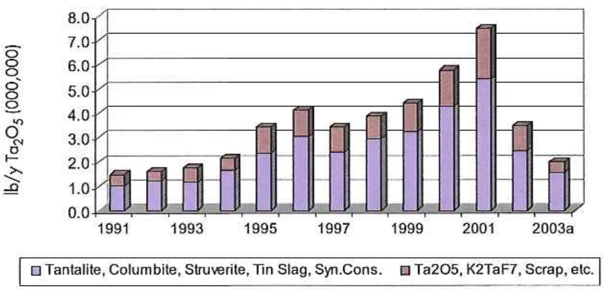

Figure 2: Tantalum processors' receipts

The recent estimated tantalum processors' receipts indicate that some stability has returned to the raw material side of the business. The downward trend appears to have bottomed. Expectations are that no further decrease will be seen with the potential for a gradual increase as business conditions improve. Central African production seems to be drastically reduced, as trade data through the end of June 2003 indicate that imports into the U.S. were zero for the preceding period.

PROCESSOR SHIPMENTS - TOTAL TANTALUM

The following graph (Figure 3) of Processor Shipments of Tantalum reflects estimates for the last twelve months through June 30th 2003. It is our best estimate for each of the five categories of tantalum product shipments (the categories used by the T.I.C.). The electronics area, specifically tantalum capacitor demand, saw the greatest impact on shipments

Dr Gerblinger, President 2002-2003 (r)
Mr Reynolds, President 2003-2004 (l)

Mr Telhado presenting his paper

Staff of EPCOS, hosts of the plant tour

during the downturn. The electronics area has been hit hard, but seems to be gradually improving as inventories are drawn down and new designs for telecommunication and other products are developed. It is known from articles in the press that the other tantalum segments felt an impact, but not as severe as the electronics sector.

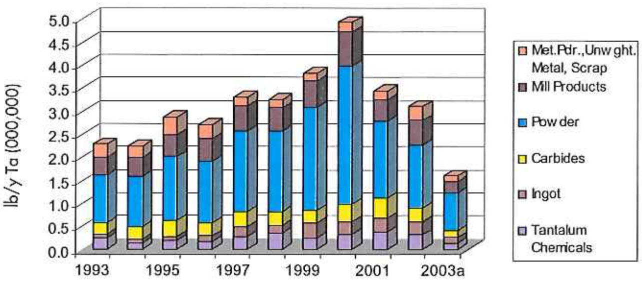

Figure 3: Processors' shipments – tantalum (all categories)

There was a considerable reduction in total shipments during 2001, and a further reduction in 2002. The 'bottom' was reached during the first half of 2002. The general level of shipments has improved, but it is very difficult to project future requirements. A selection of the categories is shown in separate graphs using the six month data intervals when appropriate.

Capacitor Grade Tantalum Powder

The tantalum powder shipments on an annual basis, with estimates for the twelve months from July 1st 2002 through June 30th 2003, appear as shown in Figure 4.

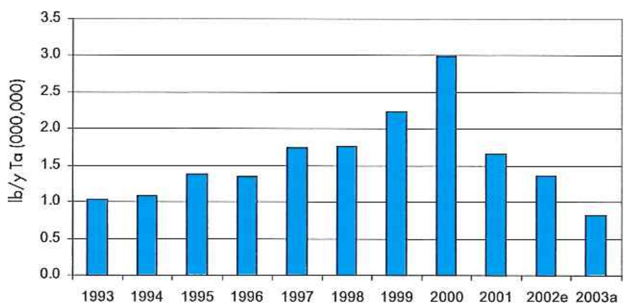

Figure 4: Processors' shipments – tantalum capacitor powder (yearly)

The bar labeled as 2003a is our estimate of six months of shipments, not an estimate for the entire year of 2003.

Figure 5 provides a look at the data on a six month interval basis for tantalum powder shipments.

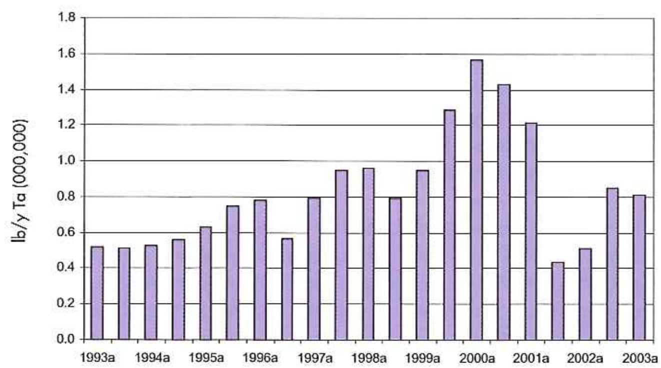

Figure 5: Processors' shipments – tantalum capacitor powder (six-monthly)

Candlelit dinner at the Carriage Museum

The Museum

The ladies

Dancers

With thanks to
Royce and Mark Gussack
William Serjak
Fernand Cyroux
Judy Wickens

The last two bars – representing the last 12 months – show an increase in powder shipments, compared to the first six months of 2002. The lowering of powder inventory levels should result in increased shipment levels of powder. Reported resolution of well publicized contract disputes could also contribute to higher shipment levels. The electronics business has seen an increase in capacitor demand activity, particularly in the Far East, and demand for passive components in general has improved.

The use of tantalum powder is primarily as the anode of a tantalum capacitor. It is currently estimated that about 50% of the total tantalum shipped is used in this application. These capacitors are utilized on the circuit boards of cellular phones, laptop computers, digital video and still cameras, entertainment systems, and automotive, medical, and military electronics systems.

Additional tantalum in the form of wire and vacuum furnace components adds to the total consumption in this application area. On a weight basis, the current level of consumption of powder and wire can be expressed as the ratio 6:1, powder to wire. Competing technologies are ceramic (MLCC), aluminum, and niobium-based materials, with niobium being a potential substitute in specific low voltage applications.

Tantalum Mill Products

The mill product segment (Figure 6) is affected by demands of the tantalum capacitor industry due to the use of tantalum wire in anode construction and fabricated heat shields, sintering trays, and fasteners of tantalum in the anode sintering furnaces. These same fabricated components are utilized in other high temperature, high vacuum applications. In addition, tantalum is noted for its superior corrosion resistance properties. This enables the metal to be used for the lining in process vessels, piping, valves, heat exchangers, thermowells, and mixing equipment. The mill products segment also includes tantalum sputtering targets that are used as the source for the vaporization of the metal as metal, oxide, or nitride followed by controlled deposition on another material.

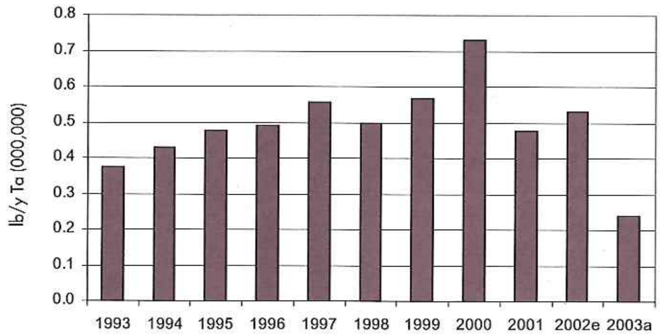

Figure 6: Processors' shipments – tantalum mill products

Annual demand in 2003 is anticipated to be about 500 000 pounds per year.

Tantalum Ingot

The definition of the materials in this category (Figure 7) has been revised to represent a product shipped by a processor. Metal in the form of ingots can be used as an additive to alloy compositions or by a fabricator to manufacture chemical processing equipment or other selected products requiring the properties of tantalum. The first half of 2002 saw a drastic drop in demand as orders for air and land-based engine alloys were cancelled during the economic downturn.

Estimates for the most recent 12 months suggest that the market remains at 250 000 to 300 000 pounds of tantalum per year for this application area.

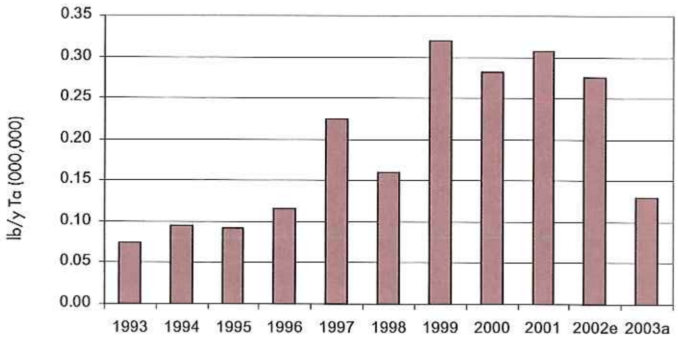

Figure 7: Processors' shipments – tantalum ingot

Conclusions

Reports in the electronics press have indicated that the demand for tantalum capacitors and other passive components has been improving – the bottom has been reached – and requirements are increasing, especially in the Far East. Quarterly improvements of 2 to 3% in capacitor units have been noted. The demand is primarily in consumer products with hopes that new designs and features in cellular phone technology will encourage growth in sales. Recent news articles also provide an indication that corporations are beginning to replace computer systems and related infra-structure, which should also create an increase in demand for these components.

The data from capacitor manufacturers suggest that receipts of powder and wire reached their lowest level in the last two quarters of 2001 and the first two quarters of 2002.

The case size distribution of the tantalum capacitors has a significant impact on powder requirements. Consumer products typically require A and B case tantalum capacitors which historically use about 5 and 10 milligrams of tantalum respectively in each of those case sizes. Smaller case size products can have anode weights less than 5 milligrams and in some designs, the powder weight is less than 1 milligram. The demand for larger case size tantalum capacitors, C, D, and E, using high capacitance powders at 40 000 CV/g and higher, has decreased. It is these larger sized anode requirements that would create a more rapid increase in demand for tantalum powder.

The demand for tantalum in the chemicals, ingot, mill products, and other segments probably remains relatively steady with the usual ups and downs from each six month segment to the next.

NIOBIUM RAW MATERIAL PRODUCTION

Pyrochlore concentrates, mined in Brazil and Canada, supply about 90% of the world's niobium requirements. Additional niobium-bearing raw materials, including columbite, are furnished from mineral concentrates obtained primarily for their tantalum content in Africa, Australia, Brazil, China, and Canada, with additional quantities being obtained from tin slags from southeast Asia and Brazil. Some additional niobium resources are available in the former Soviet Union and these are being exploited. Approximately 7.5% of the remaining niobium requirements are obtained from columbite and the remaining 2.5% from other minerals such as struverite, tantalite, and tin slags. Estimates of niobium ore production are shown in Figure 8.

The last six months of 2002 appear to have remained relatively strong concerning demand for niobium products, hence mining activity from the three major suppliers continued at a high rate of production. There does not seem to be any indication of a significant slowdown in demand for niobium products in total, except in the area of where vacuum-grade ferro- and nickel-niobium are required, specifically for air and land based turbines.

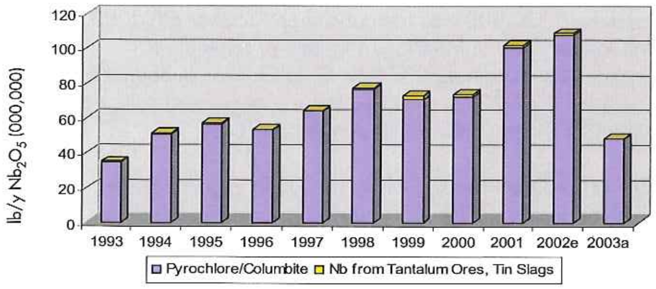

Figure 8: Niobium raw material production

The yellow cap on top of each bar represents the niobium oxide content of mineral concentrates such as columbite, tantalite, struverite, and tin slags. These niobium values are extracted and separated from the tantalum contents and other impurity elements via solvent extraction technology. It is a small percentage of the total and is not competitive as a feedstock for HSLA grade ferro-niobium, produced directly from pyrochlore by the miners of this mineral. It is generally used as a high purity oxide for added value product applications.

PROCESSOR SHIPMENTS – NIOBIUM

As explained above, the major product of refined niobium is HSLA ferro-niobium, with pyrochlore as the raw material source. Vacuum grade ferro-niobium and nickel-niobium utilize a high purity niobium oxide for the feedstock to manufacture these alloys. That oxide is generally produced from non-pyrochlore mineral concentrates, but the largest pyrochlore mining and processing facility in Brazil, CBMM, also refines niobium oxide and produces vacuum-grade alloy as well as specific niobium chemicals and niobium metal. The estimated processor shipments of the various categories of niobium products are shown in Figure 9.

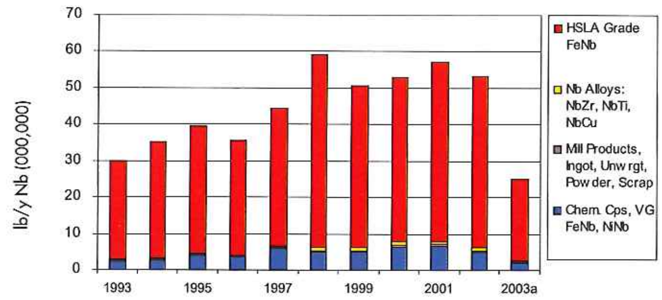

Figure 9: Processors' shipments – niobium (all categories)

The overwhelming influence of the HSLA grade ferro-niobium on total niobium demand is readily observed from these data. The applications for this product are pipeline steel, the automotive industry, and micro-alloyed steels for structural requirements in buildings. In 2002 the total shipments are estimated at 100 million pounds of contained niobium as a 60-65% Nb alloy.

The shipments of chemical compounds and vacuum grade ferro- and nickel-niobium alloy are shown in Figure 10.

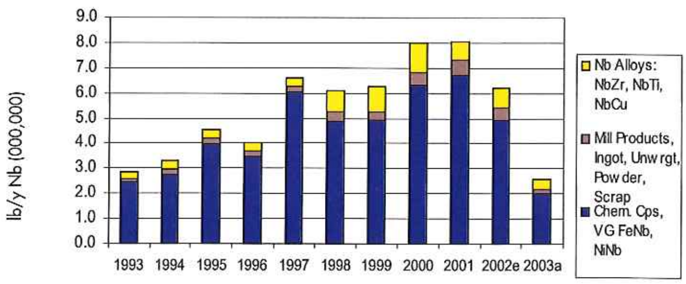

Figure 10: Processors' shipments – niobium chemicals, metal and alloys

The category is the second largest category of product shipments, with the vacuum grade alloys accounting for about 90% of the contained niobium in this category. The ferro- and nickel-niobium alloys are used as an additive for the preparation of various nickel-based superalloys. The family of Inconels is the most common application with niobium levels ranging from 1 to 6.5%. Pure niobium metal can be used but there can be some concern regarding the source and quality of the metal if it is derived from scrap. Inconel 718, 706, and 625 are the dominant alloys in this family with niobium levels ranging from 3 to 5.5%. The use is in land and air-based turbines (about 75%) with the remaining alloy used in applications involving corrosive environments with widely ranging temperatures. Another application for the alloys is in gamma-titanium aluminides for use in high temperature environments, primarily in aircraft applications.

The chemicals category contains niobium oxide, lithium niobate, niobium chloride, and niobium carbide. The two most significant chemicals, based on their volumes, are the carbide and oxide. The carbide finds application in cutting tool and wear applications, generally in combination with other carbides and cobalt. Niobium oxide is used in glass compositions for lenses for cameras and other optical equipment where a high refractive index is desired. Niobium oxide with a purity of 99.999% is used in the production of lithium niobate for use in Surface Acoustic Wave (SAW) filters in electronic circuits. The oxide is also used as a coating on glass or plastic lenses to increase light transmittance. Ceramic capacitor formulations of the perovskite structure will contain niobium oxide to achieve high dielectric compositions.

Processor Shipments of Niobium Alloys

The data in Figure 11 represent actual data through June 30th 2002 and estimated data for the next two six month periods for NbZr, NbTi, and NbCu.

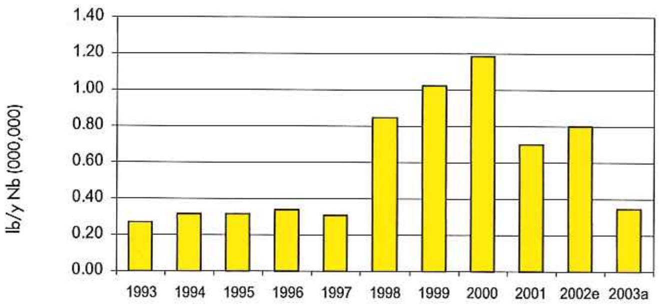

Figure 11: Processors' shipments – niobium in niobium alloys (NbZr, NbTi, NbCu)

NbTi is a superconducting alloy used in Magnetic Resonance Imaging (MRI) equipment that is used to examine soft tissue inside the body without radiation, a non-invasive procedure. The alloy (52 to 54% Nb) is converted into wire filaments and wound into a coil configuration that is held at liquid helium temperatures. Radio frequency waves are generated which modify atomic structure within tissues and the resultant information is converted into a pictorial format.

The large volumes of this alloy during the period from 1998 through 2001 reflect NbTi demand for the Large Hadron Collider Project near Geneva, Switzerland. It will be the world's most powerful particle accelerator measuring 26 km in circumference. Completion is expected in 2005.

Nb1%Zr alloy tubing is used in high-pressure sodium vapor lamps as the heater for the vaporization of the sodium. Demand for these products is expected to remain relatively stable.

SUMMARY - NIOBIUM

There is no shortage of niobium-containing raw materials. Ready availability from existing mining operations combined with very adequate reserves provide a great deal of stability in availability and pricing of niobium materials. Significant expansions have been completed at CBMM in Brazil and at Cambior in Canada. The deposit of Niocan (not a member of the T.I.C.) at Oka, Quebec, in Canada is planned for operation in 2004 with a target of 2800 tonnes Nb per year in ferro-niobium.

The demand for niobium products has remained relatively stable, estimated shipments for the first 6 months of 2003 indicate no real downward trend for total niobium shipments. Estimated shipments of HSLA ferro-niobium for the first half of 2003 indicate that the level for the whole year will be similar to the shipments in 2001 and 2002. The only significant reduction in requirements has been in the vacuum grade alloy production for turbine applications: cancellation of power generating facilities on a world-wide basis plus cancellation of aircraft orders resulted in a drop in demand.

UN REPORT

The Panel of Experts submitted a further report to the Security Council on October 23rd 2003, on the Illegal Exploitation of Natural Resources and Other Forms of Wealth of the Democratic Republic of the Congo.

A large part of the work of the Panel in the six months of its mandate was the resolution of issues raised in its preceding report, and Annex I to the present report summarises the results. Category I lists companies with which the Panel has been in contact and regards the issues as having been 'resolved – no further action required'. The report states that 'the parties listed in category I may be viewed as having been removed from the Annexes' to the preceding report, in which they were listed as being in breach of the OECD Guidelines for Multinational Enterprises. Paragraph 10 of the latest report refers to the example of 'coltan' and the Panel's decision to 'raise the awareness of the international business community' to the issues it believed were involved. Its 'purpose was to raise the standard of corporate behaviour and governance in conflict areas'. The extent of the dialogue between the Panel and the parties 'varied widely'.

Categories II, III and IV list 'parties that have been referred to OECD National Contact Points or Governments for monitoring or follow-up', as the Panel has reached the end of its mandate and wished to leave no unresolved cases in the files. Category V lists parties that did not react to the preceding report although they had the opportunity to do so.

DLA/DNSC

On October 1st 2003 the Defense National Stockpile Center announced its Annual Materials Plan for the year FY 2004, from October 1st 2003 to September 30th 2004. Tantalum and niobium (columbium) materials included were:

Columbium concentrates	560 000 lb Cb
Columbium metal ingots	20 000 lb Cb
Tantalum carbide powder	4000 lb Ta
Tantalum metal ingots	40 000 lb Ta
Tantalum metal powder	40 000 lb Ta
Tantalum minerals	500 000 lb Ta
Tantalum oxide	20 000 lb Ta

The sale of 2000 lb vacuum grade metal (i.e. ingots) to H.C. Starck for $120 000 was announced on October 6th 2003. On October 16th an offering of tantalum/columbium concentrates containing 237 864 lb Ta_2O_5 was announced for November 12th 2003. This was to be a negotiated sale, not a sale under the Basic Ordering Agreement (BOA).

BOA procedure was used when 16 000 lb vacuum grade tantalum metal and 20 000 lb tantalum oxide were sold to H.C. Starck and Mitsui Mining announced on November 5th.

Sales of vacuum grade tantalum metal and of tantalum oxide available under the Annual Plan for FY 2004 have now been completed, states DNSC.

Under the arrangements of the BOA, there should be a posting on the DLA/DNSC web site each Wednesday by 11.30a.m. showing materials available and whether there is an intention to sell them at that time. Potential purchasers have three working days to respond and make an offer.

MEMBER COMPANY NEWS

The following six companies were elected to membership by the Forty-fourth General Assembly on October 13th 2003:

A & R Merchants
2855 Ocean Avenue, New York, NY 11235, U.S.A.
Tel.: +1 718 743 2219 Fax: +1 718 743 1704
e-mail: armerchants@aol.com

Daesung
KIRaM, Support Center for Industry and Academic Co-operation, Sunchon National University, Sunchon City, 540-742, Korea.
Tel.: +82 61 755 6444 Fax: +82 61 755 6415
e-mail: kiram@daesunginc.com

Furisa Ltd. Inc.
44 Verdi Boulevard, Sonstraal Heights, 7550 Durbanville, South Africa.
Tel.: +27 21 975 2025 Fax: +27 21 975 2026
e-mail: Michael@furisa.com

Rosredmet
Mojaiskay str. 2, 198013 Sankt-Petersburg, Russia.
Tel.: +7 812 316 5712 Fax: +7 812 316 6675
e-mail: rosredmet@peterlink.ru

Simmonds (Metal Trading) Ltd
Lion Cottage, The Green, Burnham Market, Norfolk PE31 8HE, England.
Tel.: +44 1328 730733 Fax: +44 13288 7300734
e-mail: simmomet@globalnet.co.uk

TVEL Corporation
24/26 Bolshaya Ordynka Str., Moscow, 119017, Russia.
Tel.: +7 095 239 49 22 Fax: +7 095 239 44 04
e-mail: root@tvel.ru

The following companies have **resigned** from membership:
AstroCosmos
AVX Tantalum Corporation
Leo Shield Exploration Ghana
Matsushita Electronic Corporation
North American Capacitor Company
PCC Airfoils

Tantalum-Niobium International Study Center
40 rue Washington,1050 Brussels, Belgium.
Tel.: +32 2 649 51 58 • Fax: +32 2 649 64 47
e-mail: info@tanb.org
The T.I.C. is an *association internationale* under Belgian law.