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# T.I.C.

## TANTALUM-NIOBIUM INTERNATIONAL STUDY CENTER

## PRESIDENT'S LETTER

To the T.I.C.

I want to personally express my thanks to outgoing T.I.C. President, Charles Culbertson II, and the Kemet Corporation for hosting Symposium 2000. Thanks to H.C. Starck, Flextronics International, Intel and all the participants who worked hard to make this well-organized event a huge success!

From the beginning, the plans for Symposium 2000 called for discussions of supply chain management. The recent, unforeseen growth in demand has made these discussions all the more important. While global tantalum resources are plentiful, uncertainty surrounds the timing and economics of new production. Supply could still become tighter in the years ahead with the high market growth forecasted. Effective supply chain management and long term commitments supporting reinvestment economics are needed to bring stable growth to the tantalum market.

We all look forward to the opportunities that come along with this exciting economy, but must work hard to meet its challenges! Certainly the work by CBMM to put together next year's annual meeting will be worthwhile effort for all T.I.C. members.

Sincerely,
*Tom Odle*
*President*

## CONTENTS



## SYMPOSIUM 2000

Symposium 2000 drew a record crowd to San Francisco from October 22nd to 25th. Over 320 people took part, with almost 270 participants registered for the technical sessions, and the event was widely described as a resounding success.

Presentations spanned the industry from raw material supply to end-uses. Primary sources round the world, including its own burgeoning production, were reviewed by Sons of Gwalia, the world's largest tantalum miner. The statistics collected by the T.I.C. were presented by the association's Technical Promotions Officer, giving an industry overview (see this issue). Advances in processing were discussed by notable companies in this industry, such as Cabot, H.C. Starck, Ningxia.

Tantalum and niobium in electronics featured largely, with some of the world's leaders such as Kemet, AVX, Vishay and NEC relating developments in tantalum capacitor technology. The use of these components was the subject of papers by Flextronics International as a contract manufacturer, and by Palm, in hand held devices, and IBM, for computers.

A new way of using tantalum in orthopaedics was a novel topic for the T.I.C., a most interesting paper.

Applications of niobium in superalloys, superconductors and aircraft engine parts, as well as its major use in HSLA steels and its processing techniques, were discussed by key industry players including Cannon-Muskegon, Wah Chang and CBMM. Speakers from the Lawrence Berkeley National Laboratory and DESY described niobium superconductors' role at the cutting edge of high energy physics research.

A plant tour to Flextronics and Intel in Silicon Valley rounded off the programme. A group of delegates also took an additional field tour to the plant of Wah Chang, in Albany, Oregon.

A splendid reception offered by Kemet Corporation welcomed the group to San Francisco and opened the conference on Sunday evening with great hospitality.

On Monday a dazzling gala dinner was sponsored by the companies of H.C. Starck in celebration of their long involvement with tantalum and niobium, featuring entertainment with an American Anthem theme appropriate to the California setting.

Leisure tours included sightseeing in the city and in the surrounding area beyond the Golden Gate bridge for those accompanying the delegates. One group enjoyed an additional trip to the Napa Valley wine country - a superb day of relaxation, with a delicious lunch at Clos Pegase, the cinema museum as well as the wine tasting at Niebaum-Coppola, and a highly original personal guided tour by the owner of Steltzner Winery.

## PROCEEDINGS

The Proceedings of the Symposium are being published as a hard cover book. Copies will be sent to the registered participants as part of the conference service, covered by the fee.

Others who wish to order copies should contact the T.I.C., 40 rue Washington, 1050 Brussels, Belgium.

## FORTY-FIRST GENERAL ASSEMBLY

Mr Charles Culbertson II, of Kemet Electronics, completed a dynamic year as President of the T.I.C., with this remarkable Symposium as its highlight.

Mr Thomas Odle of Cabot Performance Materials will succeed him as President. Mr Jacques Hennevaux resigned as a member of the Executive Committee: the T.I.C. thanked him for his contribution to the work of the Committee since he was elected in 1994. The other members of the Committee were re-elected to serve a further term of office.

Five new members were elected: Australasian Gold Mines NL, Hi & M Corporation, Nippon Chemi-con Corporation, North American Capacitor Company and Reading Alloys. The association approved the audited accounts for the year ended June 30th 2000. A sub-committee to review the collection of statistics was established.

The next General Assembly, the Forty-second, will take place in Rio de Janeiro in October 2001.

## APPLICATIONS

Companies wishing to apply for membership should contact the T.I.C. for an application form. An application must be sponsored by two companies which are already members.

A company applying for membership in October 2001 would receive an invitation for its delegates some three months ahead of the meeting, and would receive full membership advantages from the time of submitting a completed application. Some who wanted to take part in the Symposium in San Francisco were disappointed to find their wishes could not be accommodated in full. To be sure of your place for Rio, put your company's application in soon.

## PRODUCTS AVAILABLE

In Bulletin no. 103 we printed a table of 'Products available from T.I.C. members'. Please note that the product available from Mineração Catalão de Goiás Ltda is Ferroniobium – steel grade, and not as printed.

# TANTALUM & NIOBIUM: A REVIEW OF INDUSTRY STATISTICS

*This paper by Mr C. Edward Mosheim, Technical Promotions Officer, Tantalum-Niobium International Study Center, was presented at Symposium 2000, October 2000, in San Francisco.*

## INTRODUCTION

The Tantalum-Niobium International Study Center collects data from its membership that are consolidated to track industry mining, processing, and shipments of tantalum and niobium products in numerous forms. Data are collected semi-annually and reported on that same basis to the membership. Growth trends in the tantalum industry remain strong, with the demands for capacitor grade powder and wire leading the requirements for continued expansion of the raw material base.

Niobium growth trends continue on the same path as shown in previous years with the production of HSLA grade ferroniobium being the leading product in terms of production requirements, as this single product represents almost 90% of the niobium product sold in the world marketplace. The data will be reviewed covering the period from the early 1990s up through June 2000.

## TANTALUM RAW MATERIALS PRODUCTION

Tantalum-bearing minerals are found predominantly in Australia, the tin belt of southeast Asia, Brazil, Canada, and in Ethiopia, Congo-Kinshasa, Rwanda, Burundi, Uganda, and other countries in Africa. Resources also occur in a number of areas of China, and in the former Soviet Union. The area of southeast Asia, predominantly Thailand and Malaysia, has been the source of high grade (10 to 15% tantalum oxide content) tin slags resulting from the processing of cassiterite ores for the extraction of tin. Low grade slags containing 4% or less tantalum oxide (with some less than 2%) have been available in the past due to the high level of tin production in that area, but those resources are limited today. The only high volume mining operations are the Greenbushes and Wodgina Mines, operated by Sons of Gwalia, headquartered in Perth, Australia, where the annual production of tantalite is currently at 650,000 and 500,000 pounds of contained tantalum oxide respectively, and the company has plans to double output during the next two years. All the other resources are presently operating at a level of 200,000 pounds of contained tantalum oxide per year or lower at each of the mining sites in the countries names above. The escalating prices for tantalite during 1999 and into 2000 energized some of the mining areas, particularly those located in Africa, into increased production.

The data show the history of the production of tantalum ores and tin slags from the period of 1991 through the first 6 months of 2000 (see Figure 1).

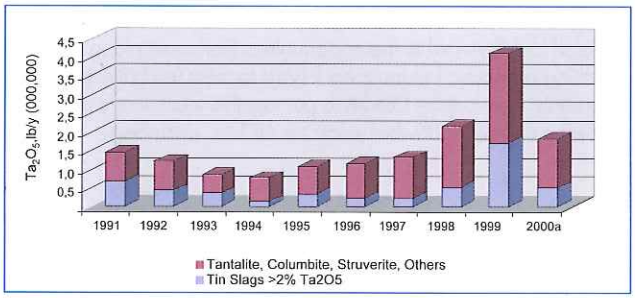


*Figure 1: Tantalum raw material production*

The low levels of production from 1991 through about 1995/1996 were bolstered by consumption of above ground inventories of ores and tin slag purchases from the 1980s. It was common practice for processors to carry large inventories of raw materials due to the unsettled and sporadic nature of mining of tantalum-bearing minerals. Previous documentation by this organization indicated an approximate inventory drawdown of about 300,000 pounds per year.

Raw material consumption in no way reflects the total world production since many of the operating mines in Africa and elsewhere do not report raw material production data to our organization. The output from those areas is not documented in our statistics unless it is purchased by a trader and sold to a member company, which would then report it as a receipt. If a member trader purchased the minerals, that member trader would report the raw material production. As a result, the raw material production figure is low in relation to the actual production in any given year.

Stockpile releases from the Defense Logistics Agency of the U.S. government also contribute about 300,000 pounds of contained

tantalum each year, with about half of that quantity as mineral concentrates and the remainder as oxide, powder, carbide, and ingot.

The current production of tin slags is primarily from the recovery from dumps generated during the 1970s and 1980s when lower grades of slags were not of particular interest. Minor quantities are still produced in southeast Asia although efforts to recover tantalum and niobium bearing minerals prior to the tin smelting process have prevailed in most cases. Significant quantities of tin slag were recovered from existing dumps and shipped during 1999.

A total of 4.1 million pounds of contained tantalum oxide were supplied from ores and tin slags as primary production in 1999. The first 6 months of 2000 have seen production reported at 1.8 million pounds.

## PROCESSOR RECEIPTS

The processor receipts are reported in tantalum oxide units from two different sources, which are shown in Figure 2.

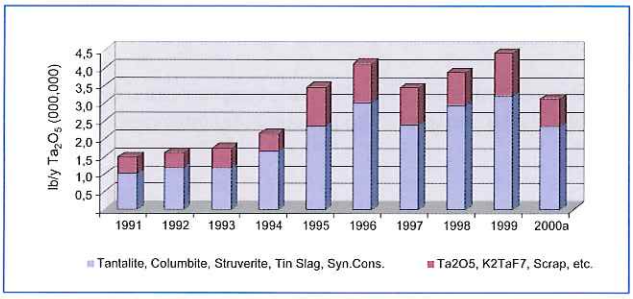


*Figure 2: Tantalum processors' receipts*

The first is primary production from the member companies plus primary production from non-TIC members, which should include a high percentage of the ores mined in Brazil, Africa, and other countries where most of the mining community is not involved with this organization. The second source is the receipt of scrap, contaminated oxide, and various other forms, which contribute significant quantities of tantalum oxide units for processing into finished forms.

During 1999, those quantities of receipts totaled 4.4 million pounds, which included 3.2 million pounds of primary raw materials and 1.2 million pounds from secondary sources. The first six months of 2000 saw processor receipts of 2.4 million pounds of primary raw materials and 0.8 million pounds from secondary sources.

A comparison of Primary Raw Material Production with Processor Receipts is shown in Figure 3.

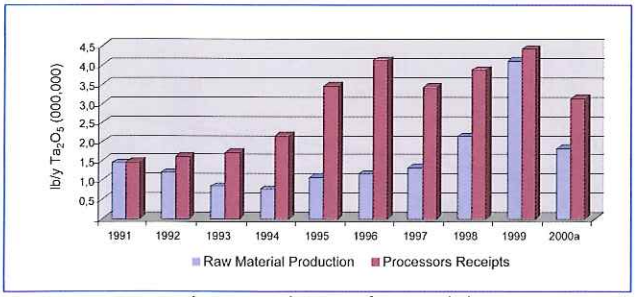


*Figure 3: Tantalum – production of ore and slag (raw material) vs. processors' receipts*

This clearly shows that the Processor Receipts have been steadily increasing during the period of 1991 through 1995/1996 as the telecommunications and computer related industries were going through a very rapid expansion and requirements for tantalum capacitors were at about 15% growth rate per year. It was also during this period that high capacitance powders were really developed into commercially viable products and demand for those materials also escalated.

A downturn came in 1996 due to overcapacity and over-exuberant forecasts in 1995. Excessive inventories of cellular phones and tantalum capacitors were the primary cause of reduced demand.

The raw material production almost equaled processor receipts in 1999 with probably some of this production actually becoming processor receipts or inventories in the first half of 2000. If the Processor Receipts data for the second half of 2000 are even close to the first half receipts, it is conceivable they will approach or exceed 6 million pounds of tantalum oxide for the year. This would be the largest reported quantity obtained by processors since these records have been kept!

## WORLDWIDE TANTALUM SHIPMENTS

Processors of tantalum-bearing materials have reported shipments of product in six different categories. These are shown in Figure 4.

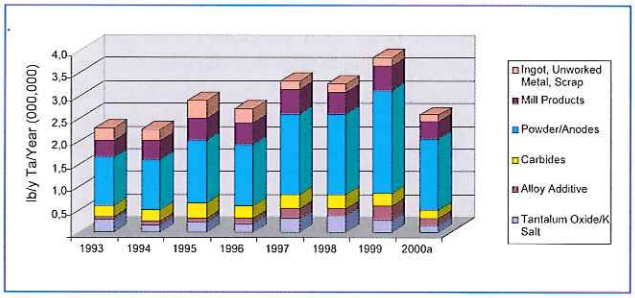


*Figure 4: Tantalum processors' shipments*

These data clearly show the impact of the tantalum powder production on the demand for tantalum atoms. The growth rate overall for tantalum-containing products during the period of 1993 through 1999 has been virtually a straight line at 8.9%. If one looks at a regression line of these same data for the period from 1995 through 2000, estimated by doubling the first half data, the growth rate during this period is 12%. A reported tantalum powder shipment level of 1.6 million pounds or 61% of the total shipments drove the first half of 2000. This number is viewed with some concern since member capacitor manufacturers, taking into account the fact that not all tantalum capacitor manufacturers are member companies, have not reported the appropriate quantity of powder in relation to this. The data are currently under review.

The telecommunications industry, as well as Internet related electronic equipment, is the driving force behind the tantalum capacitor demand. In addition, there are certain other segments that are also exhibiting accelerated growth greater than the capacitor segment, however the quantities are considerably smaller and the long-term outlook is unclear.

If you examine the six different segments shown on the previous chart, there are two segments that stand out in terms of growth rate

and future potential to significantly impact the demand for tantalum raw materials, processing technology, and capacity requirements.

## TANTALUM POWDER/ANODES

The circuit designers for telecommunications equipment have driven tantalum powder technology developments and computer and Internet related technology. Faster microprocessor speeds, more bells and whistles in a smaller package, demand for longer battery life, low voltage circuitry requirements and all the other requirements of the automotive, medical, and consumer products industries have driven tantalum powder demand with capacitance levels exceeding 60,000 CV/g in commercial quantities. These powders have enabled capacitor ratings to rise to 1000 mfd in 4 and 6-volt parts. Some of the newer designs contain anodes weighing up to 200 mg (X-Case) where five years ago a 90 mg (D-Case) anode was the largest in chip-type design configurations. Anode sizes have also been reduced, for example the P-Case is very popular, used extensively in cellular phone circuitry, and contains only 1 mg of powder.

The significance of the newer anode design configurations coupled with organic semiconductor electrolyte systems has allowed the development of the large anode chip designs. In order to understand the significance of this development, it is enlightening to consider the number of capacitors that can be produced from one pound of tantalum powder at 100% yield.

| Size | No. of capacitors |
|---|---|
| P-Case | 454 000 |
| X-Case | 2 270 |

If the world market for tantalum capacitors is 24 billion for the year 2000, for each 1% of the market that requires X-Case capacitors, the requirements are for almost 106,000 pounds of tantalum powder at 100% yield. It is estimated that the demand for this case size is perhaps about 5% so at least 530,000 pounds of powder are required just for this one case size. In 2000, the total powder shipments would be estimated to reach about 3 million pounds, assuming a doubling of the first six months data.

Figures 5 and 6 show a comparison of tantalum powder shipment rates for the periods of 1993 through 1999 and then for 1993 through an estimated 2000 by doubling the data reported for the first six months.

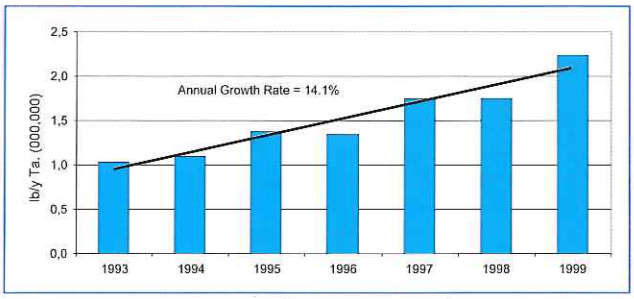


*Figure 5: Tantalum processors' shipments: Powder and anodes, 1993-1999*

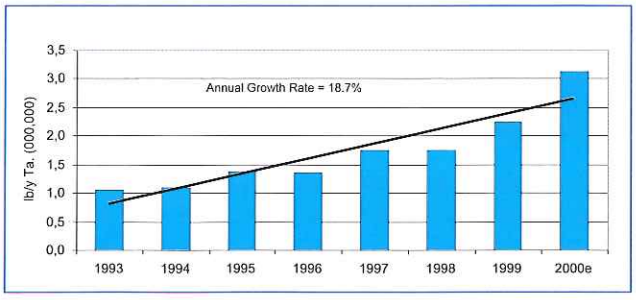


*Figure 6: Tantalum processors' shipments: Powder and anodes, 1993-2000 estimated*

The growth rate for 1993 through 1999, based on regression analysis, was 14.1% for powder shipments. Using an estimated quantity of about 3.1 million pounds for 2000 the growth rate would be 18.7%. This quantity of powder is potentially in excess of what will actually be reported when the final data for 2000 are available.

## TANTALUM ALLOY ADDITIVE

This category of material is represented by only about 300,000 pounds on an annual basis currently, but it is showing a growth trend of about 30% over the course of the period from 1993 through 2000, 2000 again estimated by using a doubling of the data reported for the first six months. The use of tantalum in applications in this category is primarily for land-based, combustion turbines used for the generation of electricity. The nominal tantalum concentration in the various alloy compositions used in this industry ranges from 2 to 12% with the most common range being 5 to 9% tantalum. Alloy characteristics include resistance to corrosive gases at temperatures up to 1000°C as well as oxidation resistance at those same temperatures. Physical properties, such as creep rupture, are also an important characteristic for these alloys at highly elevated temperatures. The alloys are designated as single crystal superalloys. Additional quantities are utilized in components for aircraft engines. Both of these industries are exhibiting significant growth.

Shipments of product into this market segment are shown in Figure 7 for the period of 1993 through 2000 (estimated).

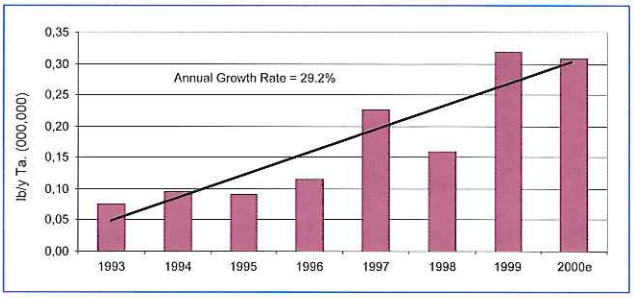


*Figure 7: Tantalum processors' shipments: Alloy additive, 1993-2000 estimated*

## TANTALUM CHEMICALS

Processor shipments of tantalum chemicals show a growth rate of about 7.6% per year. The primary material in this category of products is tantalum oxide. The oxide sees significant consumption in electronics, medical applications, optics, and as a sputtered film to form a capacitor in integrated circuitry. Lithium tantalate is used in SAW filters. The oxide is a component of an yttrium tantalate formulation that is applied as a layer in the composition of X-ray films providing image enhancement with a reduction in X-ray exposure. Lens compositions of high refractive index incorporate tantalum oxide. Figure 8 illustrates the growth of this segment

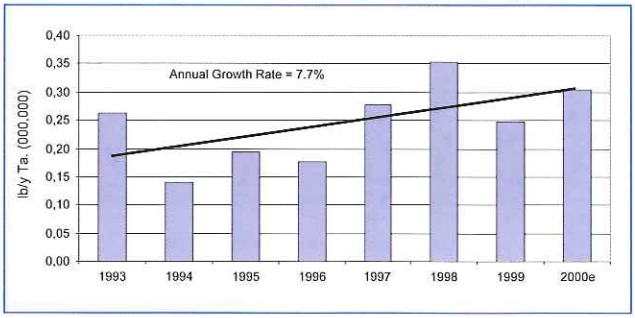


*Figure 8: Tantalum processors' shipments: Tantalum oxide and K salt ($K_2TaF_7$), 1993-2000 estimated*

## TANTALUM CARBIDES

The shipments of tantalum carbides have exhibited a growth rate of about 3% year over year. This material is an additive in cemented carbide formulations used in the preparation of tool steels for cutting steel and cast iron machining. The collected data for this segment are shown in Figure 9.

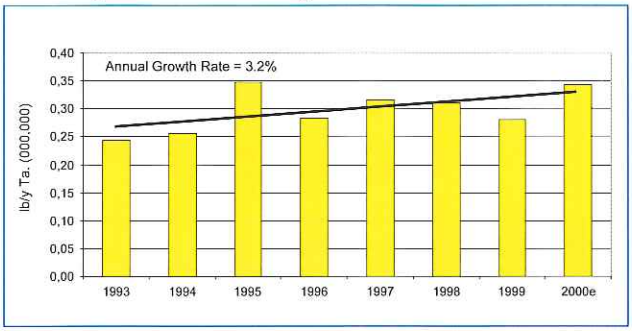


*Figure 9: Tantalum processors' shipments: Tantalum carbides, 1993-2000 estimated*

## TANTALUM MILL PRODUCTS

Processor shipments of tantalum mill products have been growing at a rate of between 6 and 8% annually, depending on the time period selected. This category of products generally covers the use of tantalum in chemical processing equipment as tank liners, heat exchanger tubing, rupture disks, connectors, thermowells, piping, and valves. It also covers the area of the use of tantalum as a sputtering target, an area that is accelerating in growth.

This category also includes tantalum in the form of wire utilized in the preparation of tantalum anodes for capacitors and fabricated tantalum trays and heat shields used in furnaces for anode sintering.

Figure 10 shows the data for this segment.

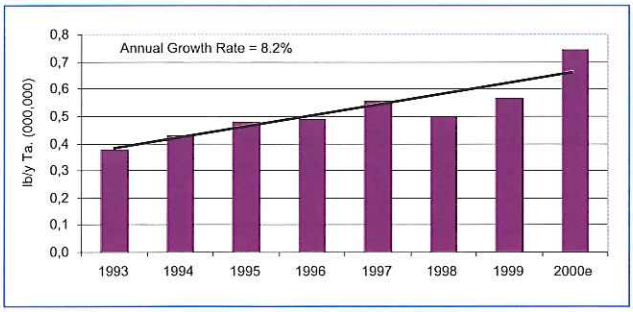


*Figure 10: Tantalum processors' shipments: Tantalum mill products, 1993-2000 estimated*

## TANTALUM INGOT, METALLURGICAL POWDER, SCRAP

This is the only category that exhibits about a 6% negative growth rate based on the data reported to the TIC. The quantities of tantalum reported in this category were only about 175,000 pounds in each of the last three years, but a doubling of the quantity reported for the first six months of 2000 suggest that the year could end with about 300,000 pounds.

## SUMMARY - TOTAL TANTALUM RECEIPTS VS. PROCESSOR SHIPMENTS

Figure 11 shows the progression of the comparison of processor receipts based on the conversion of the tantalum oxide units to contained tantalum vs. the tantalum in all shipments of tantalum containing materials.

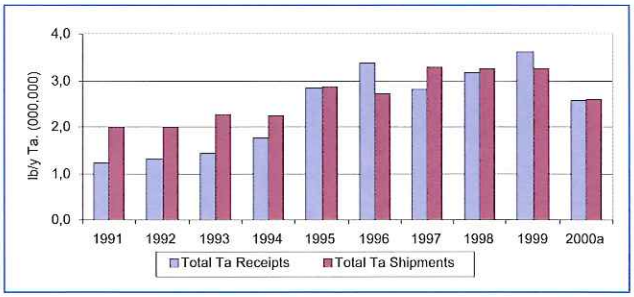


*Figure 11: Tantalum processors: total tantalum receipts vs. shipments, 1991-2000, actual figures January-June*

The data for 2000 are actual data for the first six months of the year. The only conclusion that one can come to is that receipts and shipments by processors during the last 4.5 years balance quite well. The mix of products and demand increases, especially for capacitor related materials, have taxed the raw material side of the equation as well as the processors' ability to manufacture the quantities and types of powders required by anode design requirements in the capacitor industry. The entire manufacturing chain has been stressed due to the unprecedented demands from the electronics and other industries for tantalum. The industry has witnessed sudden downturns in the past due to the unreliable forecasts primarily from the OEMs sector resulting in excessive inventory builds followed by idle capacity in the industry.

## NIOBIUM RAW MATERIALS PRODUCTION

The niobium industry is driven primarily by the demand for ferroniobium utilized by the HSLA steel and stainless steel industries. This product is derived from the mineral pyrochlore, with the largest operations being conducted by CBMM in Brazil which contributes about 70% of the total niobium requirements of the industry. Mineração Catalão de Goiás Ltda in Brazil and the Teck Corporation in Canada also mine and process pyrochlore with subsequent production of ferroniobium for these same industries. Columbite, a mineral containing predominantly niobium but also with a tantalum content ranging from 5 to 10% of the niobium content on an oxide basis, is mined on a large scale in Brazil by Paranapanema. The concentrates are converted to a ferroniobium-tantalum alloy that is utilized in stainless and HSLA steels. Alloy is also processed so that the components are separated by chemical means resulting in the production of various niobium products that are shipped into the other niobium market segments. Additionally, the ores of tantalum contain niobium. The processors of those minerals also extract and purify the niobium and produce a wide range of products for use in applications in electronics, optics, chemical processing equipment, superconductivity, and high temperature alloys. Columbite, primarily from Nigeria, is generally processed by those companies involved with tantalum feedstocks.

## NIOBIUM ORE PRODUCTION

The quantities of niobium, measured in pounds of niobium

oxide, are significantly higher in volume in comparison to those in the tantalum industry. Industry reports indicate a current production level of about 70 million pounds of contained niobium oxide with virtually all of it coming from pyrochlore and lesser quantities of columbite. The contribution of niobium from tantalites, tin slags, and other tantalum-containing minerals is small by comparison. Figure 12 shows the production of these mineral concentrates and their contribution to the total raw material production.

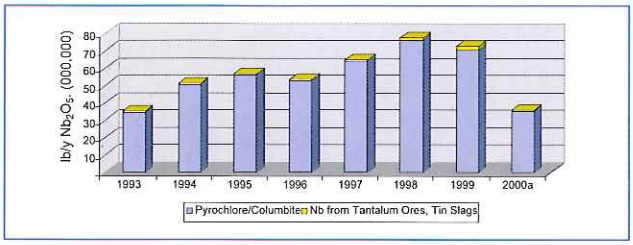


*Figure 12: Niobium raw material production*

The year 2000 data are represented by production information available for the first six months of the year.

## NIOBIUM ORE RECEIPTS/ PROCESSOR SHIPMENTS

The conversion of pyrochlore to ferroniobium is carried out by the same companies that mine the ore, namely, CBMM and Mineração Catalão de Goiás Ltda in Brazil, and the Teck Corporation in Canada. The largest columbite processor is Paranapanema in Brazil. A comparison of niobium ore receipts (converted into contained Nb from $Nb_2O_5$) shows that there is a reasonable balance between receipts and shipments, with shipments, on average, exceeding the indicated raw material sources. (See Figure 13)

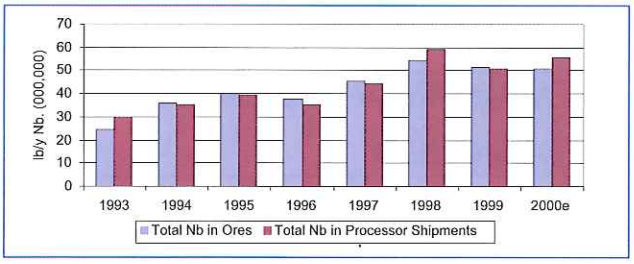


*Figure 13: Niobium: ore receipts vs. processors' shipments*

## WORLDWIDE NIOBIUM SHIPMENTS

The shipment data reported by member companies for all the various niobium product segments are shown in Figure 14.

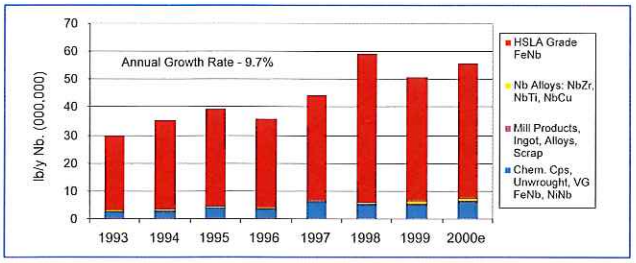


*Figure 14: Niobium processors' shipments*

The data are expressed in pounds of niobium per year with the estimated 2000 shipments reaching about 56 million pounds. A growth rate of 9.7% is indicated based on the data covering the period from 1993 through 2000 (estimated), based on the first six months' data for 2000. It is obvious that about 90% of the niobium requirements are for HSLA grade ferroniobium with the remaining 10% divided between chemicals and superconducting alloys, with mill products being the smallest market segment. (See Figure 15)

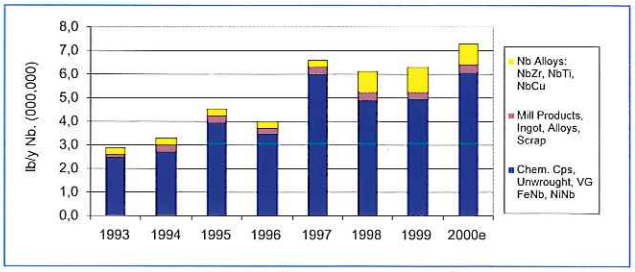


*Figure 15: Niobium processors' shipments: Chemicals, metal, alloys*

## HSLA GRADE FeNb

The growth rate for HSLA grade ferroniobium is indicated by the data in Figure 16 to be about 8.9% using data from 1993 through an estimated quantity for 2000. Abundant raw material reserves have resulted in stability in the industry. This product is used to produce high strength steel for car bodies, pipelines, shipbuilding, offshore platforms, railroad track, and tools. The presence of niobium brings grain refinement to the finished steel product and resultant strength increases.

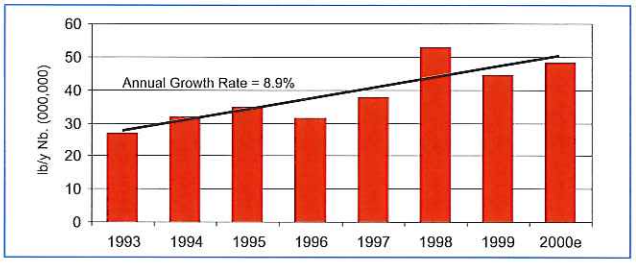


*Figure 16: Niobium processors' shipments: HSLA grade ferroniobium*

## NIOBIUM CHEMICALS, UNWROUGHT METAL, VACUUM GRADE FeNb, NiNb

This market segment covers a number of unrelated market areas. The primary large volume chemicals are niobium oxide and niobium carbide. The oxide finds numerous uses in ceramic capacitor formulations, optics compositions, lithium niobate for SAW filters, glass coatings to reduce reflectance on computer screens or to increase light transmittance when used in a "stacked" pile. Niobium carbide is used in cemented carbide formulations for cutting tools, generally in combination with other carbides and cobalt.

Vacuum grade ferro- and nickel-niobium are utilized in the manufacture of high temperature alloys that find use in turbines for jet aircraft engines and stationary power generation equipment, while niobium alloys containing tungsten, tantalum, hafnium and zirconium find use in engine and nose cone components for rockets.

The growth rate for this segment is calculated at 12.1% over the period from 1993 through 2000 (estimated based on the data from the January through June period). (See Figure 17)

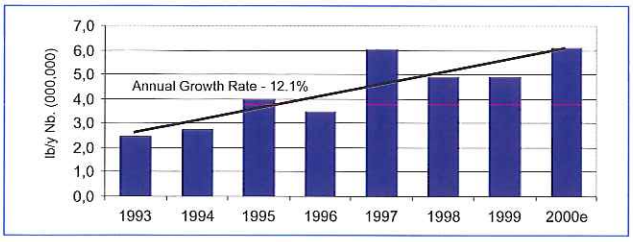


*Figure 17: Niobium processors' shipments: Chemical compounds, unwrought metal, vacuum grade ferroniobium, nickel-niobium*

## NIOBIUM ALLOYS - NbZr, NbTi, NbCu

The utilization of niobium-titanium wire in superconducting coils has drastically altered the demand for niobium in this market segment in the last three years. During the period from 1993 through 1997, demand ranged between 250,000 and 350,000 pounds of contained niobium per year. The requirements for the Large Hadron Collider project at Cern, near Geneva, Switzerland, provided an additional demand for this alloy totaling 400 tons of niobium titanium alloy and 23 tons of pure niobium metal. The jump in shipments is due, at least in part, to that requirement.

Niobium-titanium alloy is also used in MRI equipment, a non-radiation system for whole body imaging of soft tissue, as well as in magnetic levitation systems for experimental transportation concepts. Niobium-zirconium alloy is used in high-pressure sodium vapor lamps commonly seen in lighting systems along our highways and shopping malls. (See Figure 18)

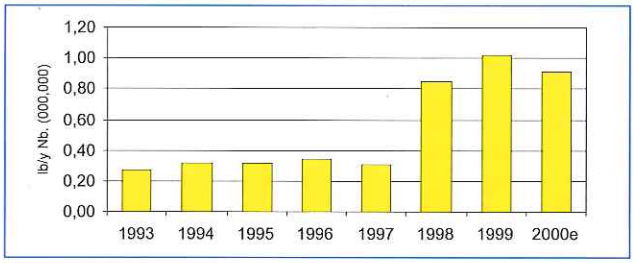


*Figure 18: Niobium processors' shipments: Niobium alloys, NbZr, NbTi, NbCu*

A growth rate for this segment is not shown since demand involves a severe step function due to the project noted above. The demand for niobium-titanium alloy after completion of the Large Hadron Collider project should be expected to decrease unless a new requirement becomes known.

## SUMMARY - NIOBIUM

Worldwide demand for niobium products continues to grow at a sustainable rate of 9.7% since 1993. Raw material availability is not a concern due to the tremendous quantities of pyrochlore available in Brazil and Canada as well as columbites from Brazil and Nigeria. Additional pyrochlore resources are being evaluated in Canada and in Africa with the intent to enter the HSLA grade ferroniobium segment of the business in the future.

The requirements for high purity chemicals and alloys are being met primarily by refiners of tantalum-bearing ores through the recovery of the associated niobium values with additional quantities being supplied from chemically-processed and purified niobium from pyrochlore.

## PHOTOGRAPHS



Technical session in progress - Dr Josef Gerblinger speaking, Mr John Moore as session chair




Mr Charles Culbertson II, closing the Symposium

Gala Dinner - Mr and Mrs Peter Kählert (seated)

Welcome Reception - President and guests

Welcome Reception - guests


Plant tour - one group arriving at Flextronics

Wine tour - lunch at Clos Pegase

Wine tour - tasting the new wine at Steltzner Winery

## DLA SALES PLAN

In a press release dated October 19th 2000, the Defense National Stockpile Center announced its 'tentative sales plan' for fiscal year 2001. The schedule for offerings was:

*Tantalum/columbium concentrates:* October 31st 2000, and a second offering at a later date. (On October 31st the initial offering date was rescheduled to November 9th 2000, and the amount offered was 200 000lb contained tantalum.)

*Tantalum metal, vacuum grade ingots:* November 20th 2000 (The amount offered was 40 000lb contained tantalum, as announced on October 19th 2000.)

*Tantalum metal, capacitor grade powder:* December 14th 2000

*Tantalum carbide powder:* January 11th 2001

*Tantalum oxide:* January 25th 2001

On September 22nd the DLA announced the award of 148,395lb tantalum contained to Standard Resources, for approximately $27.1 million.

## MEMBER COMPANY NEWS

### New members

The following were admitted to membership by the Forty-first General Assembly on October 23rd 2000:

**Australasian Gold Mines NL**
P.O. Box 41, Nedlands,
WA 6009,
Australia.
Tel.: +61 8 9386 7211
Fax: +61 8 9386 7121

**Hi & M Corporation**
Azuma Bldg 4F,
3-7 Kanda Kaji-cho,
Chiyoda-Ku,
Tokyo 101-0045, Japan.
Tel.: +81 3 3258 1444
Fax: +81 3 3258 1433

**Nippon Chemi-con Corporation**
6-4, Osaki 5-chome,
Shinagawa-Ku,
Tokyo 141-8605, Japan.
Tel.: +81 3 5436 7632
Fax: +81 3 5436 7491

**North American Capacitor Company**
7545 Rockville Road,
Indianapolis, IN 46214, U.S.A.
Tel.: +1 317 273 0090
Fax: +1 317 273 2400

**Reading Alloys**
P.O. Box 53,
Robesonia, PA 19551-0053, U.S.A.
Tel.: +1 610 693 5822
Fax: +1 610 693 5542

### A&M Minerals and Metals

New address, telephone and fax from October 30th 2000:
17 Devonshire Square,
London EC2M 4SQ, England.
Tel.: +44 20 7655 0370 / Fax: +44 20 7377 1942

### Cambior

Cambior's 50% share of production from the Niobec Mine in the third quarter of 2000 totalled 261 467kg niobium in ferroniobium. Jipangu Inc has a first-rank mortgage on Cambior's interest in the Niobec Mine: in November Cambior announced that the mortgage would be converted into equity. Cambior manages the marketing of the mine product, and the remaining 50% interest in the joint venture was with Teck Corporation, which operated the mining and production facilities. On November 23rd Teck Corporation announced the sale of this 50% interest to Mazarin Inc.

### Sons of Gwalia

Highlights of the annual report for the year to June 30th 2000 included record tantalum production of 1 111 967lb $Ta_2O_5$, extended tantalum sales contracts which significantly increased sales and volumes, and plans for increased production (see Bulletin 103).

Production in the quarter ended September 30th was 323 570lb, with all production facilities working at full capacity. The output was even higher than had been forecast, as increased tonnages were being treated at the Wodgina mine and the operating improvements continued to be applied in the processing plant.

In November the company announced the completion in principle of a US$120 million bond issue in the USA to support the expansion of the tantalum operations by freeing cash flow and providing working capital. Notes have been placed with a number of large US pension funds, and Mr Peter Lalor, Executive Chairman, expressed great satisfaction that the demand for the notes had been strong.

### Kazatomprom

NAC Kazatomprom has a web site at
www.kazatomprom.com

### Kemet

On October 10th Kemet announced the 'implementation of business transactions across the Internet' with Arrow Electronics (described as the world's largest distributor of electronic components and computer products) and TTI, Inc., to improve efficiency and enhance Kemet's ability to meet its supply chain partners' needs.

For the quarter ended September 30th 2000, net sales were 95% higher than the equivalent quarter in 1999, and net earnings were ten times as high. Demand for most tantalum capacitors exceeded industry capacity, and the company was adjusting its capacity to produce larger case sizes in an effort to reflect the changes in demand. Mr Maguire also announced that Kemet was exploring all available avenues to increase supply of the tantalum powder and wire which are its raw materials, no doubt this search resulted in the joint venture described below.

### Kemet/Australasian Gold Mines

Kemet announced on November 15th 2000 a Memorandum of Understanding with Australasian Gold Mines to establish a joint venture to own and fund that latter's existing tantalum projects, including the pilot plant at Galgaranga. The feasibility of future mining and commissioning of plants would be determined, and the deal provided for purchase by Kemet of processed tantalum products from the pilot plant and any future processing development.Kemet saw the opportunity to take part in establishing a potenti

### Silmet

Silmet has an e-mail address and a web site:
e-mail: commerce@silmet.ee /web site: www.silmetgroup.com

### H.C. Starck GmbH & Co KG

H.C. Starck GmbH & Co KG has signed an agreement to acquire the CSM group, which manufactures molybdenum and tungsten mill products, as well as machined components and fabrications from other refractory metals, including tantalum and niobium. H.C. Starck is thus making a move towards 'forward integration' to expand its activities, extending its scope downstream in the industry. CSM has its headquarters in Cleveland, Ohio, and employs 500 people in the United States and Europe. It is the parent company of T.I.C. member Special Metals Fabrication in England. The acquisition is subject to approval by the U.S. antitrust authorities, which is expected to be given.