

# T I C

## TANTALUM-NIOBIUM INTERNATIONAL STUDY CENTER

### PRESIDENT'S LETTER

Dear Friends,

Summer in Europe is coming to an end: the leaves start changing their colours and we move into a hopefully beautiful Indian summer. This is about the time we all should leave the northern hemisphere and we have only one place to go – beautiful Rio where we can expect a very interesting Forty-eighth General Assembly of our association.

Our hosts Fluminense and CBMM will certainly be ready with their part of the preparations for the site visits and the meeting. The speakers will have their presentations well prepared and will be waiting for our interested audience.

The Forty-eighth General Assembly will represent a kind of break in our association: our well known, well reputed and beloved Secretary General, Mrs Judy Wickens, for the first time in 30 years will not be present. Instead we will see a new face, which, maybe, is looking a bit familiar to long-time members. This feeling is right, Ms Emma Wickens, our new Secretary General, is Judy's daughter. We all wish her a hearty welcome and a successful start!

Also for me there will be a change: not only that my term as President comes to an end, but as a consequence of my departure from H.C. Starck I am also going to leave my position as Executive Committee member. I should like to thank every one of my old friends in this organisation for their help and support during my duty to the T.I.C., more than 10 years. However I surely will continue to follow the business of this association and would like to stay in contact to my long lasting friends.

See you all in Rio!

Axel Hoppe, President

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#### Transport problems?

A new system for reporting transport denials and delays for Class 7 materials is being established by a UN agency. If you have experienced difficulties with the transport of minerals and raw materials, please contact the T.I.C. so that we can inform you about the procedure.

### FORTY-EIGHTH GENERAL ASSEMBLY AND TECHNICAL MEETING

The 2007 meeting of the Tantalum-Niobium International Study Center will be held in Rio de Janeiro from October 21st to 24th. Following the formal General Assembly on the morning of Monday October 22nd there will be a session of technical presentations, and a second technical session will be held on the morning of Tuesday October 23rd. On Wednesday October 24th there will be plant tours to Industrial Fluminense and CBMM.

A welcome reception on the evening of Sunday October 21st and a gala dinner jointly hosted with CBMM on the evening of Monday October 22nd will complete the programme for delegates. Sightseeing tours for accompanying persons will be arranged. The conference will be held at the Sheraton Barra Hotel.

### TECHNICAL PROGRAMME

#### ABSTRACTS

##### Monday October 22nd 2007

#### **Mibra Mine, the Volta Grande Pegmatite, Nazareno, Minas Gerais, Brazil: Mining and Metallurgical Performance**

by Dr F.R.M. Pires, Associate Professor of Geology, Rio de Janeiro Federal University, and Antônio Carlos Girodo, Associate Professor of Mining Engineering, Minas Gerais Federal University

The Mibra Mine, including the Volta Grande pegmatite, corresponds to one of the most interesting mining projects in the world. Conventional surface mining, a hydrogravitic plant, dry magnetic and electrostatic separators represent the fundamental steps in the recovery of the economically valuable heavy minerals, namely tantalum-rich tantalite-columbite, microlite and cassiterite. The mineral concentrates are regularly transported to an extractive metallurgical plant located in São João del Rei, at a distance of 70 km from the mine, for the purpose of producing tantalum and niobium oxides, fluorine-rich salts and aluminium alloys.

Regionally the Volta Grande pegmatite is a portion of the São João del Rei pegmatite province, which encircles at least 250 pegmatite bodies enclosed within greenstones invaded by granite. Several pegmatite bodies, mostly explored in the past, surround the Volta Grande pegmatite. The Volta Grande pegmatite consists of two levels of tabular, 10-25m thick, zoned, sub-horizontal bodies, containing quartz, albite, K feldspar, spodumene, zinnwaldite, lepidolite and subordinate amounts of apatite with disseminated rare element minerals. Recent



resource estimations established the presence of 8 million tons of pegmatite grading 350 g/ton of tantalite+microlite and 200 g/ton of cassiterite. Mining cycle operations include drilling, blasting, some mechanical excavation of the fresh enclosing amphibolite and hard and weathered pegmatite ore, loading and transportation of the ore to the concentration plant and the waste material to the tailings. Current production is around 350 tpy of tantalum concentrates and 100 tpy of cassiterite. Prospecting, exploration, sampling work and resource/reserve estimation related to ore tonnages and grades have been improved, which has encouraged investments.

CIF/Mibra has produced in recent years high quality feldspar for the ceramic industry from both the old tailings and material derived from the wet plant. Cleaning work results in the production of 100 000 tpy of feldspar-rich material. The Mibra project also plans, for the near future, the recovery of lithium material contained in the spodumene. A current project involves the production of kaolinite from the weathered Fumal, Urubu and Palmital pegmatite bodies, starting at the end of this year. It is important to note the vigorous approach of CIF/Mibra in promoting an almost integral recovery of the pegmatite minerals aiming to minimise costs and to obtain high plant recovery and metallurgical performance. In addition, the enterprise is committed to operating safely with minimum environmental impact, being a reference as a modern and efficient integrated mining metallurgical complex.

#### **Very high CV tantalum-powder-paste – a new technique for very small capacitors**

*by Dr Ralph Otterstedt, Marianne Gottschling and Helmut Haas, H.C. Starck GmbH, Central Research & Development (presented by Dr Otterstedt)*

The trend towards offering more capacitance in a given volume or footprint, or alternatively to offer the same capacitance in a smaller volume or footprint, continues to move forward the development of very high CV tantalum powders. However, pressing of very thin anodes using these high CV-Ta-powders becomes more and more challenging, due to limits in flowability of these powders as well as the mechanical strength of the resulting anodes. In particular, anode designs with less than about 250 microns thickness, for example as desired for microchip- and multianode-capacitors (low ESR), are difficult to produce with current pressing technologies. We report on a new technique using Ta-powder-pastes and stencil printing on thin Ta-foil which is able to produce ultra low profile anodes and almost any 2D-shape. Furthermore, this technique allows safe handling of highest CV-Ta-powders and reduces demands on the physical properties of the powder and anode such as flowability and green strength. First electrochemical tests of such capacitor anodes show promising results. A simple process to produce high-performance Ta-anodes with high productivity seems to be feasible.

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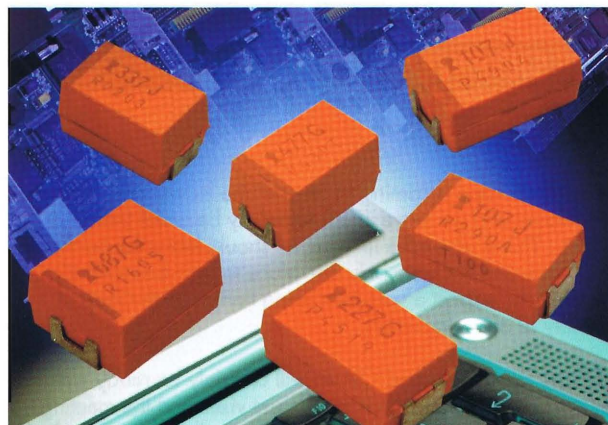
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**The T.I.C. is an association internationale  
under Belgian law.**

#### **Growth in the Use of Niobium Oxide Capacitors**

*by W.A. Millman and Dr Tomas Zednicek, AVX (presented by Bill Millman)*

In the short period of time that niobium oxide capacitors have been available they have attracted a number of application design-wins where the technology has provided a perfect fit. First seen as a direct lower cost replacement for older tantalum capacitor designs, they have in fact found a strong customer base within the latest designs of consumer and automotive equipment. This paper will explore the performance and safety benefits that have allowed this technology to prosper and grow while other such alternate offerings have fallen by the wayside.



AVX capacitors with niobium

#### **High Reliability and Critical Applications of Tantalum Capacitors**

*by Y. Freeman, R. Hahn, P. Lessner and J. Prymak, Kemet Electronics (presented by Yuri Freeman)*

Despite constant pressure from aluminium and ceramic capacitors, solid electrolytic tantalum capacitors have been on the market for about half a century. Wet tantalum capacitors have an even longer history. During this period of time, many other electronic components appeared on the market, reached their crest, and then disappeared. There are three key parameters which keep tantalum capacitors on the market and make them attractive for their end-use in electronics. These parameters are high stability, high volumetric efficiency, and low ESR (ESL) [ESR: Effective Series Resistance, ESL: Effective Series Inductance]. Modern electronics requires further improvement of these parameters as well as a radical increase in operating temperatures and working voltages. The paper discusses these trends together with physical limitations within traditional tantalum powder and capacitor manufacturing techniques. Possibilities for further progress in tantalum capacitors with new manufacturing and testing techniques are also under discussion.

#### **Tantalum market trends in the Far East**

*by Hiroaki Yoshinaga, Advanced Material Japan*

The supply and demand situation for Japan and China is reviewed by assessing the imports and exports for each country. Sources of raw materials for Japan and their processing path to final products are discussed. Recent developments in China are noted, together with pertinent changes in taxation and licensing policy. The paper concludes with observations on trends in shipments of electronic equipment from Japan and a comparison of recent data on sales from Japan with those from China.

#### **Mining in Nigeria – Mekios and Tin Sheds**

*by Sele Obomhense, Mekios UK*

Mekios (comprising Mekios UK Limited and Mekios Limited)



operates mining and trading activities: Mekios UK Limited controls the trading whilst Mekios Limited, located in Nigeria, has considerable landholdings in that country, where production occurs. Nigeria was and is highly prospective for niobium and tantalum minerals (as well as other metals) and currently nearly all production is in the hands of artisanal miners. Mekios is developing its own prospects as well as trading and further concentrating artisanal concentrates. Current artisanal practice is to wash alluvial sources during the wet season and provide a 'concentrate' to 'tin sheds' in Jos and other locations. Considerable material is lost in mining and washing constrained by a lack of fit-for-purpose equipment. Tin sheds (so-called as they were first set up to recover tin from the Jos granites) use primarily magnetic separation of sized concentrates bought from a variety of sources.

There is a wide spectrum of sources of tantalite and columbite in Nigeria with the result that in some areas, for example the south west states, tantalum is favoured over niobium, and often the tantalum occurs in finer grain sizes. In the granite domain of central Nigeria much of the ores are dominated by niobium minerals in ratios similar to those found in apogranites such as Pitinga and Ghurayyah.

Mekios is currently undertaking exploration over prospective pegmatite and granite areas to establish high-grade reserves. Some have already been mined at their Bishewa licence where tantalite has been recovered to blend with artisanal concentrates to provide concentrates for sale on the international market. Mekios has a field team of qualified geologists and field assistants, supported by the detailed local knowledge of artisans. It also has qualified analytical chemists who are monitoring mineral concentrates and providing field support. It is the intention of Mekios to develop a modern concentrating plant to upgrade artisanal production and mined material from its licence areas. This work is fully supported by the Ministry of Solid Mineral Development whose local representatives have had an advisory role in local projects. Nigerian Banks, operating the government's mineral development policy, are financially supportive of Mekios Mining.

**Tuesday October 23rd 2007**

### **T.I.C. Statistics, Transport Project, IMO Denial Reporting Procedure**

*by Ulric Schwela, Technical Promotion Officer, Tantalum-Niobium International Study Center*

The title covers three broad topics:

First and foremost the T.I.C. statistics, including a review of the changes in reporting that have taken place since October 2006 as well as procedures and members' responses. The actual figures collected are presented and compared to those of the previous five years.

An overview is then given of the Transport Project and the numerous significant developments which have taken place. This includes recapitulating why the Transport Project started, looking at the study's conclusions and a summary of the report produced, touching upon the IAEA Coordinated Research Programme and explaining its context and relevance to the T.I.C. members, noting the work done by the IMO and the newly formed Steering Committee of the IAEA dealing with Denial of Shipment.

Finally a more in-depth examination is provided of the IMO's initiative to collect reports of Denial of Shipment, how T.I.C. members can benefit from this, as well as a worked example of how to provide a report to the IMO.

### **The current production capacity expansion at CBMM** *by José Isildo de Vargas and Tadeu Carneiro, CBMM (presented by José Isildo de Vargas)*

The development of production capacity for niobium products at the leading niobium supplier CBMM is described, including the recent expansion plan leading to the increase in ferro-niobium production capacity to 90 000 tonnes per year.

CBMM, with its vast reserves of niobium-rich pyrochlore at Araxá, Brazil, has established itself over the decades as the world's most comprehensive supplier of niobium products. Through its policies and practices, CBMM has made niobium one of the most reliable and cost effective materials for steel applications.

### **A New Era for High CV Tantalum Powders**

*by John Koenitzer, Tomoo Izumi and Larry A. Mann, Cabot Supermetals (presented by John Koenitzer)*

Capacitor-grade tantalum powders with ratings of 150 000-200 000 CV/g are now finding their way into commercial capacitor products. Meanwhile, new process technologies are being developed that have the capability of producing tantalum powders with ratings of 250 000 CV/g and higher. In this paper, we will describe a new generation of tantalum powders, and discuss some of the challenges that must be overcome in order to realise their full potential in capacitor applications.

### **New high performance tantalum solutions for abrasive corrosion media**

*by Dr Bo Gillesberg, Danfoss Tantalum Technologies*

A number of industrially available surface hardening techniques have been evaluated in combination with thin film tantalum layers. Tantaline thin layer tantalum coatings have, for more than a decade, shown good corrosion properties in highly aggressive corrosive media and are today used for such applications as valves and instrumentation devices. By overcoming the risk of wear-related degradation of the corrosion barrier, the use of thin film tantalum solutions may be extended to parts exposed to abrasive high velocity corrosion fluids, such as pump parts. Promising results have been obtained by thermal spray coating of ceramic layers and partial conversion of the tantalum surface to tantalum boride.

### **The Actuality and Future Development of China's Superconductive Niobium Materials**

*by He Jilin, Zhong Jingming, Chen Lin and Xie Weiping, Ningxia Orient Non-ferrous Metals Group (presented by Dr Zhong Jingming)*

Micro-wave Superconductive Cavities and Accelerator fabricated from metallic niobium have high accelerating field intensity, low energy-dispersion properties and long life due to the excellent superconductivity and thermal conductivity of the metal, so metallic niobium has become the most proper metal for fabricating Superconductive Accelerating Resonance Cavities. With the development of high energy techniques in physics and the continuous improvement of superconductive accelerating cavities' accelerating gradient, requirements have increased for pure niobium material for superconductive usage and its fabricating techniques. During recent years, there has been a great development in the China niobium industry in metallurgy, refining and processing. Ningxia Orient Non-ferrous Metals Group Company (NONMG) has continuously upgraded niobium products by promoting technical innovation and improvement on the aluminothermic reduction process for fabricating metallic niobium, and on the melting techniques of a 600KW electron-beam furnace and related equipment. The purity of niobium products has been enhanced continuously, and the contents of



impurities such as O, N, C and H in the niobium ingots are lower than 10ppm. RRR of niobium slice with coarse particles can be 587 at most. The RRR value of rolling superconductive niobium material has been upgraded from around 50 at the beginning to more than 300. Ningxia Orient Non-ferrous Metals Group Company has already been equipped with some capability in producing superconductive niobium material, and has provided products to engineering projects worldwide. Ningxia Orient Non-ferrous Metals Group Company intends to continue its innovation on superconductive niobium materials.

## Redeveloping Mozambique's Tantalum Mining Industry

by Dr John P. Herselman, Noventa

Mining of the Mozambique pegmatites started as early as 1926 and by 1975 Mozambique had become the world's second largest producer of beryl, with significant contributions to tantalum, lithium, and niobium production. These, largely manual, mining operations were forced to cease around 1986 as a result of the post-independence civil war. Subsequent production has been dominated by artisanal activities and some limited mechanised mining of the soft upper portions of the ore bodies.

The abandoned deposits remain ore bodies of significant potential even though previous mining activities have reached close to the transition zone between the soft and underlying hard rock ore. Noventa, recognising their potential for industrialised scale mining of hard ore, has seized the opportunity of an ordered development of these deposits.

In converting to a market economy, Mozambique embarked upon a series of political and economic reforms which after 10 years of multi-party political stability has turned it into a model investment destination in Africa. The country has experienced real GDP growth of 8.1% over the last decade, and has, in recent years, attracted several mega investments in the mining, minerals and energy sectors.

Having secured the rights to Mozambique's key tantalite deposits, Noventa is committed to the establishment of industrial scale operations on its concessions. As a first step, the Marropino mine has been re-developed as a fully industrial operation and the nearby Morrua mine is now into development. A drilling programme is also underway to define reserves and ore characteristics of the other concessions, which will lead to the implementation of an operational development programme stretching way into the future.

The company is actively pursuing the establishment of a centralised finishing plant to further upgrade the concentrates from the various mines to provide a consistent quality product to the market.

## Talison and the outlook for tantalum feedstock supply

by David Miller, Strategic Development, Talison Minerals

The supply of tantalum feedstock to processors is entering an interesting phase where inventories are gradually being depleted, with the potential to be off-set by new projects or expansions within existing operations.

This paper examines the supply and demand dynamics of tantalum feedstock over the next five years, including an overview of Talison, the new company formed from Sons of Gwalia's Advanced Minerals assets, and its future role in the industry.

## HOST COMPANIES

Two Brazilian member companies will host tours during this meeting:

## Cia. Industrial Fluminense

Companhia Industrial Fluminense is a member of the Metallurg Group, which has operating units in U.S.A. and U.K. as well as the mine and plant in Brazil at São João del Rei in Minas Gerais State. The Metallurg Group acquired Cia. Industrial Fluminense in 1979 and since 1996 CIF has focused its production on tantalum and niobium oxides and aluminium alloys and tablets. Information on the mining and processing operations can be seen in the abstract of the paper to be presented on behalf of this company.

## CBMM

Companhia Brasileira de Metalurgia e Mineração is part of the Moreira Salles Group, and its niobium mine and associated plant are situated near Araxá in Minas Gerais State, Brazil.

The pyrochlore deposit is mined by the open-pit method, using no explosives. A conveyor belt 3.5km long transports the mineral ore from the mine to the concentration plant, which has installed production capacity of 84 000 tons per year. Processing is carried out by wet grinding, magnetic separation, desliming and flotation. Wet grinding separates out the pyrochlore crystals, and ore particles are reduced to less than 0.104mm. Magnetic separation is used to eliminate magnetite, a mineral with a high phosphorus content, and desliming removes fractions below 0.005mm in cyclones of 25mm. Flotation concentrates pyrochlore in tanks where pyrochlore particles are mixed with chemical reagents and trapped by air bubbles introduced at the bottom of the tank. The concentrate which thus floats contains 60% Nb<sub>2</sub>O<sub>5</sub>, and the underflow is transferred to a tailings disposal dam.



CBMM sintering plant

The pyrochlore concentrate is refined by a pyrometallurgical process developed by CBMM which includes pelletising and sintering the product of the flotation process, followed by reductive melting (or dephosphorisation). Water is used only to granulate the concentrate and to wash the gases during sintering. The pyrometallurgical plant installed in 2000 has provided greater efficiency, a reduction in emissions and a better quality product. The output of this plant is used as the raw material for the niobium products manufactured by CBMM, such as niobium oxide. The unit for niobium oxide production was introduced in 1980 and has undergone constant improvements which have led to considerable cost reductions. In 1998 a special unit for the production of very pure niobium oxide, mainly used in optical applications, began operation, a result of dedicated research and development by the company.

CBMM has produced standard grade ferro-niobium since 1965, using the classic aluminothermic reduction process. In 1994 a semi-continuous process with aluminothermic reduction in an electric arc furnace was introduced. A secondary plant using the conventional process can produce 600 tons of ferro-niobium



monthly, and is available for periods of peak demand, special specifications or in response to restrictions in electric power supply. A fully automated crushing and packaging plant for ferro-niobium has been installed, to eliminate manual handling. Installed capacity to manufacture ferro-niobium increased from 45 000 tonnes in 2004 to 70 000 tonnes in 2007, and further expansion is well under way which will bring capacity to 90 000 tonnes in 2008.

The company's special alloys plant produces vacuum grade ferro-niobium and also nickel-niobium, as masteralloys, with high quality as the main concern. Two electron-beam furnaces are used for the production of pure niobium metal and 1% niobium-zirconium alloy: rated capacity is 210 tons/year of cylindrical-shaped ingots manufactured to ASTM B-391 specifications.

## MEMBER COMPANY NEWS

### DAVID MAGUIRE

The Tantalum-Niobium International Study Center was very sad to learn that Mr David Maguire, of Kemet Electronics, had passed away in August.

Mr Maguire was a very well known and highly respected member of the tantalum community and truly a major figure in the world of tantalum capacitors, as the driving force behind Kemet. His constant support of the T.I.C., long membership of the Executive Committee and his many contributions to the association's activities by means of presentations and technical papers were greatly appreciated. The breadth and depth of his knowledge meant that his views were always valued by his audience.

David Maguire will be long remembered in the history of the tantalum industry.

### Abinger Trading

The nominated delegate of Abinger Trading is now Mr Richard Merrison, following the departure of Mr David Bensusan from this company.

### Angus and Ross

In its annual report and accounts for 2007 Angus and Ross stated that its subsidiary undertaking Mineração Marfim Ltda has as its only asset 100% ownership of the Caçara tantalum project in the Brazilian state of Rio Grande do Norte.

### Gippsland

The activities report of Gippsland for the quarter April to June 2007 included the receipt of an updated feasibility study for the 40 million tonne Abu Dabbab project in Egypt. A total cost of US\$108 million was estimated, including capital costs for 'a 2 million tonnes per year processing plant, mining fleet, roads, power plant and general infrastructure', an increase from the November 2005 estimate of US\$90 million. Gippsland was 'in negotiation with its tantalum off-take customer to adjust tantalum contractual arrangements to take into account the revised capital and operating costs'. Work commenced on a drilling programme to upgrade the inferred resources, and it was anticipated that the reserves would increase to more than 20 million tonnes from the present figures of 14.6 million tonnes. The company is also thinking of examining further some of the other targets in the immediate region of Abu Dabbab which have been known for a long time and were explored in the 1970s.

Two Egyptian Directors were appointed to the board of Tantalum Egypt JSC in April 2007: the other two members of the board represent Gippsland, including Mr Jack Telford as Executive Chairman. Mr Jon Starink, formerly with Sons of Gwalia for ten years, was appointed to the Board of Directors of Gippsland in May.

Also in April, this company raised funds in London which are intended in part to support the progress of the Abu Dabbab project 'towards being a world scale tantalum producer'.

### Sons of Gwalia/Talison Minerals

The administrators of Sons of Gwalia advised that the sale of the Advanced Minerals Business of the company was completed on August 27th 2007, and control transferred to the buyer. The new company will be called Talison Minerals Pty Ltd. The consortium responsible for the purchase is led by Resource Capital Fund IV LP, and has members representing four global funds. The Purchase and Sale Agreement was approved by the meeting of creditors on June 28th 2007.

The Chief Executive Officer, Mr Peter Robinson, and members of the senior management team will continue in their present roles. Mr Robinson thanked all who had offered their continuing support during the period of administration and in achieving completion of the sale. He added that 'being a leading participant in the advanced materials industry, Talison now has the opportunity to take full advantage of the rapid growth forecast for tantalum and lithium, both in electronics applications and, in the case of lithium, for clean energy to power electric cars'.

A presentation will be made at the T.I.C.'s meeting in October 2007 by Mr David Miller, General Manager Strategic Development of the new company Talison Minerals.

### Kemet

On August 10th Kemet announced that it had agreed to acquire Arcotronics Italia, 'a leading manufacturer of plastic film and metallized plastic film capacitors and wet tantalum capacitors', adding that Arcotronics has manufacturing facilities in Italy, Germany, the United Kingdom, Bulgaria and China. The transaction is expected to close in early October 2007. CEO Mr Per-Olof Loof commented that this 'provides an excellent complement to our recent acquisition of the Evox Rifa Group of companies earlier this year'.

The company unveiled its new Patent Wall at the Innovation Center, Kemet's headquarters, in June, celebrating the award of nine patents in fiscal year 2007 to inventors within the company, an exceptionally high number. The Patent Wall displays plaques for the new awards along with more than 100 from previous years. The new patent holders each received a commemorative plaque and had a chance to talk about their inventions and the importance of these. Dr Phil Lessner, Chief Technology Officer and Chief Scientist, congratulated the scientists on their contribution to Kemet's 'renewed focus on becoming a leader in technology'.

In Kemet's annual report on fiscal year 2007, Mr Loof was pleased to observe that the company had extended its series of consecutive profitable quarters to eight, and in the year had met or exceeded all its financial objectives. For the Tantalum Business Unit, net sales were US\$424.203 million in 2007, increased from US\$292.234 million in 2006, and operating income was US\$1.301 million in 2007, compared with US\$7.879 million in 2006. An increase in net sales of 45.2% for 2007 over 2006 was attributed to the acquisition of EPCOS in the period affected, but the integration of the former EPCOS also accounted for the drop in operating income, according to the report.

### Metalysis

A funding round by Metalysis was completed in July to support



three product lines to reach commercial production, using its patented technologies for metal extraction. One of the projects is to work in partnership with Rolls-Royce in Malaysia 'to produce high-grade tantalum for use in supercapacitors for mobile telephony and other high-end portable electronic products'.

The special process of Metalysis uses a novel electrolytic method for reducing metal oxides to metal in a molten salt, with 'significantly lower environmental impact than traditional methods' and an economic cost advantage.

#### **NAC Kazatomprom**

In July, celebrating 10 years since it was established for the processing of uranium and beryllium products as well as tantalum, this company reviewed its history and listed some 30 'break-through projects' which would constitute its New Frontiers. 'Establishment of production of high-technology tantalum products: development of technologies and production of high capacity and super high capacity tantalum powders; construction of condensing plant jointly with American producer; production of tantalum products – rolled products, wire and targets' composed the tantalum-oriented section of the expansion plan.

#### **Noventa (Highland African Mining)**

The company which joined the T.I.C. in 2005 as Highland African Mining was renamed Noventa earlier this year. The company continues to develop the Marropino mine in Mozambique with the intention of 'becoming an industrial scale supplier of tantalum' with 'a strategy designed to enable it to become one of the world's largest and lowest cost suppliers of tantalum concentrate'.

In May it announced that technical issues would cause some delay in the forecast increase of output to full capacity, estimated at 300 000lb Ta<sub>2</sub>O<sub>5</sub> for the financial year. In a subsequent statement the company mentioned modifications to the processing plant to remedy problems such as variable grades and excess oversize material. Grades were found, on average, to be lower than expected. Although he described the delay as 'clearly frustrating', Mr Clinton Wood, Chairman, commented that Noventa was taking 'vigorous action'.

In March 2007 Noventa was admitted to the Alternative Investment Market of the London Stock Exchange.

Reserves and resources are estimated as 19 million lb Ta<sub>2</sub>O<sub>5</sub> contained, and annual production is expected to rise to 900 000lb Ta<sub>2</sub>O<sub>5</sub> contained by 2009. The company says it has 'secured long term off-take agreements for a large proportion of its tantalum production'. The mine also produces morganite, a gemstone.

#### **Specialty Metals Company**

The membership of Specialty Metals Company is being transferred to Specialty Metals Trading SA, which has taken over the trading activities of SMC. The nominated delegate is Mr Philippe Lavagna. The address remains 42A rue Tenbosch, 1050 Brussels, Belgium. Telephone +32 2 645 76 11, fax +32 2 647 73 53.

#### **Tertiary Minerals**

On July 9th Tertiary Minerals announced the lifting of the voluntary suspension of its shares from trading on AIM (Alternative Investment Market). The company had agreed a course of action with its Saudi joint venture partners and with the Deputy Ministry for Mineral Resources in Saudi Arabia (which oversees mineral licences) which Tertiary expected to result in the issue of a new exploration licence for the Ghurayyah tantalum and niobium deposit and ultimately in the issue of a mining licence. Tertiary and its partners had applied for a new five-year renewable exploration licence for a 47km<sup>2</sup> area covering the Ghurayyah deposit and the surroundings. The licence application covered tantalum and niobium, the main metals of economic interest, and required additional consideration by the authorities because the

main minerals also contained small amounts of radioactive minerals which might be the subject of special terms and conditions.

The original licence was granted in January 2002 for five years, renewable for a further period of five years. Following the establishment of a new mining code in January 2005, Tertiary applied in December 2006 for a renewal of its exploration licence under transitional provisions and also a new mining licence under the revised code. The application was initially rejected for problems associated with 'technicalities of the conditions of application and renewal', but Tertiary remains convinced that a licence will be granted and it is pursuing a mutually acceptable solution.

Ghurayyah is described as a world-class deposit containing valuable tantalum, niobium, zirconium and yttrium. The last estimated inferred mineral resource indicated nearly 400 million tonnes grading 0.024% Ta<sub>2</sub>O<sub>5</sub> and 0.28% Nb<sub>2</sub>O<sub>5</sub> as well as zirconium oxide and yttrium oxide. A scoping study suggests the deposit has commercial potential and at an extraction rate of 1.5 million tonnes per year would have a mine life of over 200 years. A preliminary feasibility study is in progress.



**CBMM arboretum: inauguration in 2001...**



**... and the same place six years later!**