

# COBALT NEWS

PUBLISHED BY THE COBALT DEVELOPMENT INSTITUTE

---

12/1

January 2012

## **2 Comment**

### **3 In-situ Plasma Synthesis and Deposition Platform for Energy Storage Devices**

## **4 Call for Papers**

## **5 Cobalt Medical News**

### **6 Picatinny Cobalt Alloys show Promise for Sustained Firepower**

### **8 Geopolitics Impact Cobalt, PwC Study Shows**

### **9 ECHA pushes five cobalt salts through for Prioritisation for REACH Authorisation... but was this proposal well informed?**

# COBALT NEWS

## CHAIRMAN

S. Dunmead (OM Group, USA)

## VICE CHAIRMEN

D. Morgan (Queensland Nickel, Australia)  
T. Shepherd (Shepherd Chemicals, USA)

## DIRECTORS

I. Akalay (CTT, Morocco)  
P. Benjamin (BHP Billiton, Australia)  
K. Drinkwater (ICCI, Bahamas)  
G. Dyason (Xstrata Nickel, Canada)  
D. Elliott (Tenke Fungurume Mining, DRC)  
C. Hallberg (Sandvik, Sweden)  
T. Higo (Sumitomo MM, Japan)  
R. Martin (Shu Powders, China)  
A. Mehan (Rubamin, India)  
V. Mittenzwei (Kennametal, Inc., USA)  
R. Morris (Vale Inco, Canada)  
M. Mounier-Vehier (Eramet Group, France)  
T. Southgate (Chambishi Metals, Zambia)  
C. Tybaert (Umicore, Belgium)

---

### THE COBALT DEVELOPMENT INSTITUTE

167 High Street, Guildford, Surrey, GU1 3AJ, UK

Tel: (0)1483 578877 Fax: (0)1483 573873

email: [info@thecdi.com](mailto:info@thecdi.com)

Website: [www.thecdi.com](http://www.thecdi.com)

Editor: D. Weight – Production: I. Porri

---

The Cobalt Development Institute carries out activities from a head office in Guildford, UK, to promote the use of cobalt. It is legally incorporated as an association of a wholly non-profit making character in accordance with its memorandum and articles, which are available on request. Membership of the CDI is open to those engaged or interested in the industry, by application and acceptance by the Board.

Cobalt News exists to disseminate promotion material on uses for, and development in, cobalt technology supported by items of interest to cobalt producers, users and all their customers. Unless otherwise stated as copyright reserved, Cobalt News permits the reprint of articles if fully credited to Cobalt News and its contributors where appropriate.

Comment is the responsibility of the Editor. Views expressed by the contributors are their own. Neither necessarily reflect those of the Institute, its directors or its members. Material is presented for the gen-

## COMMENT

Nervousness seems to be the predominant sentiment in the marketplace, with plenty of uncertainty for the Eurozone and weaknesses in other markets. Cobalt is not immune from these developments and the price has drifted from a high of around US\$18/lb (LME cash seller) at the beginning of the year to around US\$14/lb (LME cash seller) towards the end, having reached a low of about US\$12.50/lb (LME cash seller) in between.

Where it goes from here will largely depend on whether the EU has the ability to resolve the crisis on the Euro, or whether it continues to fiddle while Rome burns.'

Regulatory issues have dominated the past few years and it is likely that 2012 will be no different. Not that industry has any problem with this, but given the potential impact on business and these very difficult economic times, it would be appreciated if these things were applied proportionately and in a fair, transparent and non discriminatory way. Regulators and Legislators should work much more closely with industry to ensure effective implementation which also supports economic development and drives innovation.

The next CDI Cobalt Conference will be in Vancouver on 30/31 May 2012 and we are now seeking papers. So if you would like to present a paper in Vancouver please contact me at [david.weight@thecdi.com](mailto:david.weight@thecdi.com). We are particularly keen to receive papers on some of the more innovative uses for cobalt. Please check the CDI website in the New Year for details.

May we take this opportunity of wishing you the Compliments of the Season.

eral information of the reader, and whilst believed to be correct, the CDI, its members, staff and contributors do not represent or warrant its suitability for any general or specific use and assume no liability of any kind in connection with the provision of the said information.

The Cobalt Development Institute is an English Company Limited by Guarantee and is registered at 167 High St., Guildford, GU1 3AJ

# In-situ Plasma Synthesis and Deposition Platform for Energy Storage Devices

*Mohanty Pravansu, Ph.D. – University of Michigan Dearborn, USA*

The conventional process for fabricating electrodes used in high energy density storage devices is a multistep procedure. The steps include:

- Synthesis of active electrode material
- Addition of materials such as conductive carbon and binders
- Coating the slurry onto a current collector
- Thermal treatment of the composite coating under vacuum
- Assembling and testing the electrodes in a cell for evaluation of electrochemical properties

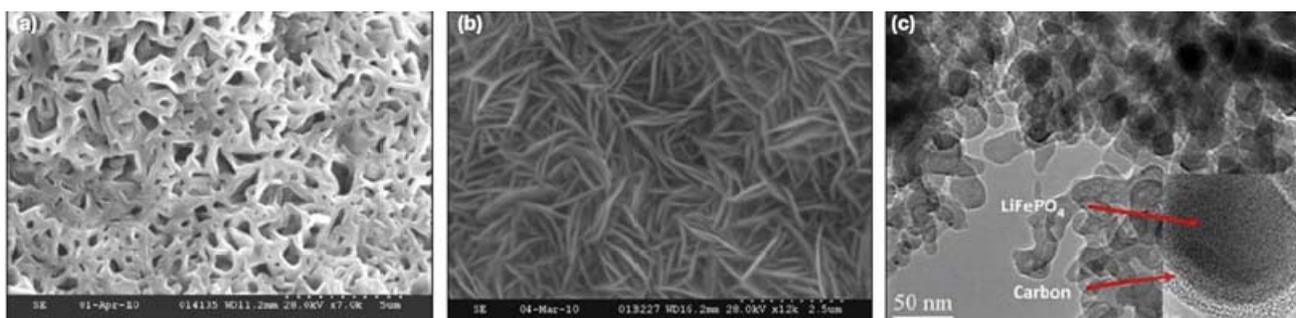


**Fig. 1 – Roll-to-roll deposition process**

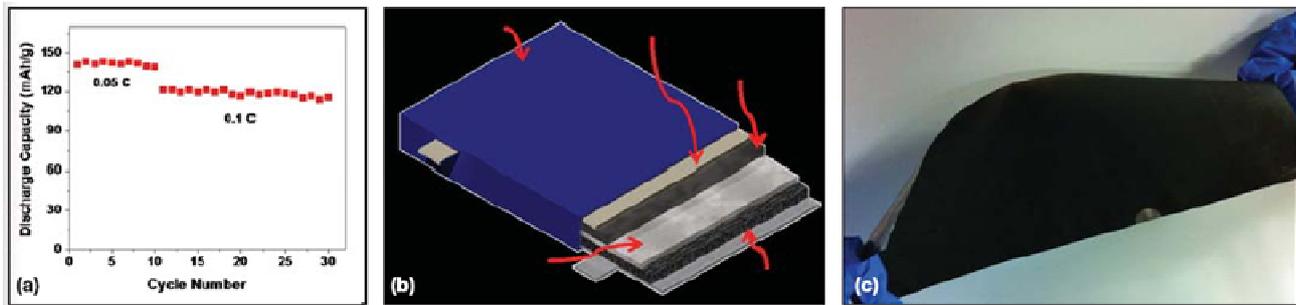
Because each of these steps is a complex process in its own capacity, the overall effort is a time intensive and expensive procedure. The polymer binders used in these electrodes also limit the operating temperature range of devices, making it

necessary to add a robust thermal management system, which prevents the use of these devices in many applications. To address these issues, the Additive Manufacturing Process Laboratory of the University of Michigan-Dearborn developed a plasma/laser in-situ synthesis and deposition technology, which offers a high speed, cost effective and scalable “platform” approach to the synthesis of supercapacitor components, battery components, and novel Li-ion cell architectures. This technology platform directly converts precursor solutions into consolidated films to dramatically reduce the production time and manufacturing cost of Li-Ion batteries and supercapacitors. Inexpensive chemical precursors are used to form the active films directly on the current collectors, thereby eliminating the need for a polymer binder, the necessity for handling and treating nanopowders, and the need for the off-site powder manufacturing facilities found in the industry today.

Figure 1 shows the deposition process in action. The process starts with a carefully engineered precursor solution that is fed into an axial injection plasma jet. Following injection into the plasma plume, the precursor solution undergoes atomization, and the droplets convert into the solute particles. These particles are accelerated via the plasma plume, converted into the appropriate phase in flight, and deposited onto a substrate in the form of film. To get the correct phase and stoichiometry, the choice and design of the precursor solution are critical. Depending upon the material system, a secondary laser/plasma beam is used to engineer the microstructure and the topology of the film. Several complex multicomponent material systems have successfully been synthesized and deposited



**Fig. 2 – SEM of  $\text{Co}_3\text{O}_4$ (a) SEM of  $\text{LiMn}_2\text{O}_3$ (b) and  $\text{LiFePO}_4$ (c)**



on this platform including  $\text{LiCoO}_2$ ,  $\text{LiMn}_2\text{O}_3$ ,  $\text{LiFePO}_4$ ,  $\text{V}_2\text{O}_5$ ,  $\text{Co}_3\text{O}_4$ , and  $\text{Li}_{1+x}\text{Al}_x\text{Ti}_{2-x}(\text{PO}_4)_3$ . This novel manufacturing process yields binderless  
**Fig. 3** – Discharge capacity of  $\text{LiFePO}_4$  (a); all solid state cell configuration (b); and monolithic flexible cell (c).

$\text{Li}[\text{Ni}_x\text{Co}_{1-2x}\text{Mn}_x]\text{O}_2$ ,  $\text{LiFePO}_4$ ,  $\text{V}_2\text{O}_5$ ,  $\text{Co}_3\text{O}_4$ , and  $\text{Li}_{1+x}\text{Al}_x\text{Ti}_{2-x}(\text{PO}_4)_3$ . It should be noted that this is an atmospheric process and provides significant cost advantages compared to many industry standard vacuum deposition processes. Eliminating the use of presynthesized powder/targets also provides significant advantages.

SEM and TEM images of deposited electrodes (Fig. 2) show a contiguous matrix with desired porous structures. Porosity is required in film based electrodes to facilitate facile diffusion of ions during the electrochemical oxidation and reduction processes. TEM observations of  $\text{LiFePO}_4$  films indicate the most desirable characteristics (Fig. 2c): the presence of fine nanoparticles with size in the range 30-60 nm surrounded by a ~2-3 nm thick carbon coating. This porous microstructure, uniformly enriched with fine-sized nanoparticles and readily altered to meet specific application demands, is one of the many unique advantages of this solution-based plasma spray approach. Although the process is still being optimized, the electrochemical characteristics (Fig. 3a) of these directly manufactured electrodes are already comparable to conventionally manufactured films.

and entirely solid state cells (Fig. 3b-c) that have high energy and power density at temperatures at which no other devices can survive, and which can be conformally applied to fit any form factor.

The University of Michigan's Office of Technology Transfer recently licensed this promising technology platform to CSquared Innovations Inc., a startup company launched by Dr. Pravansu Mohanty and colleagues from the University of Michigan. The company recently received a federal grant to develop thin-film batteries and attracted investment capital to begin optimizing the technology across multiple fields of use. It operates a fabrication lab in Farmington Hills, Mich. and maintains a business office in the U-M Venture Accelerator in Ann Arbor, Mich.

Dr. Mohanty Pravasu is a professor of mechanical engineering at the University of Michigan, Dearborn; email: pmohanty@umich.edu.

First published by ASM International in the November 2011 issue of the *International Thermal Spray and Surface Engineering (iTSSe)*, AM&P supplement. Reprinted with permission

## THE Cobalt Conference

**The Fairmont Waterfront  
30/31 May 2012**

**The Cobalt Development Institute will hold its annual Cobalt Conference in Vancouver, Canada in May 2012.**

The programme hasn't been finalised yet but papers will include:

- Detailed cobalt market reviews
- Review of global cobalt trade flows
- Regulatory matters and updates
- Supply chain sustainability
- Presentations on major cobalt related projects and mining operations
- Latest on sector developments and applications such as GTL, Superalloys, Batteries, Chemicals

**If you have a paper which you feel would be of interest, there is still time to include it in the programme. Please contact David Weight at the CDI.**

# Medical Cobalt News

## FDA Clears First Balloon-Expandable Stent for Iliac Arteries

November 4, 2011 — Medtronic Inc. announced approval by the U.S. Food and Drug Administration (FDA) of the Assurant Cobalt Iliac Balloon-Expandable Stent System.

The new medical device features the first balloon-expandable stent made from a cobalt-chromium alloy to be approved by the FDA for the treatment of narrowed iliac arteries. It complements the company's self-expanding Complete SE Vascular Stent, already approved with an iliac indication. The iliac arteries branch off the aorta in the abdominal area and carry blood to downstream vessels that perfuse the pelvis, legs and feet.

FDA approval was supported by the nine-month results from the ACTIVE (Use of the Assurant Cobalt Iliac Stent System in the Treatment of Iliac Vessel Disease) trial, which examined the outcomes of 123 patients at 17 United States sites.

The Assurant Cobalt stent had low rates of major adverse events, target lesion revascularization (TLR) and target vessel revascularization (TVR) — all at 0.8 percent. In addition, the device also achieved a 99.2 percent primary patency rate, meaning only one of the 123 study patients required a reintervention through nine months of follow-up.

“The Assurant Cobalt stent demonstrated excellent safety and long-term patency in the prospectively conducted and core lab controlled ACTIVE trial, with some of the lowest rates of 9-month TLR ever seen in an iliac interventional trial,” said William A. Gray, M.D., of New York Presbyterian Hospital and co-principal investigator of ACTIVE. “The approval of this stent, along with the previous Complete SE self-expanding stent, significantly adds to the armamentarium for interventionalists, and therefore benefits our patients.”

The new stent leverages the strength of cobalt chromium and a unique modular design to create a device with ultrathin, round, edgeless struts. This allows for smooth delivery to iliac artery lesions and high conformability to the vessel wall without sacrificing radial strength.

It is the only balloon-expandable device to utilize a 6 French sheath for the entire size matrix — from the smallest (6 mm x 20 mm) to the largest (10 mm x 60 mm) size — for the treatment of iliac arteries.

For more information: [www.medtronic.com](http://www.medtronic.com).

Article can be found at:

<http://www.dicardiology.com/article/fda-clears-first-balloon-expandable-stent-iliac-arteries>

## Cobalt-chromium stent carries drugs in hundreds of reservoirs

A cobalt-chromium reservoir-based stent design that incorporates hundreds of small reservoirs, each acting as a depot into which drug polymer compositions are loaded, has been announced by Cordis Corp., Warren, N.J.

The Nevo Sirolimus-eluting Coronary Stent allows drug delivery from an implant surface that is 75% polymer-free bare metal upon insertion. It becomes fully bare metal following drug delivery and polymer bioresorption in approximately three months.

The technology also greatly enhances control of the rate and direction of drug delivery, enabling a wider range of drug therapies to be delivered, and potentially increases the range of clinical applications of drug-eluting stents and other drug-device combinations.

For more information: Christopher Allman, Cordis Corp., 7 Powderhorn Drive, Warren, NJ 07059; tel: 908/412-3223; [www.cordis.com](http://www.cordis.com).

## Cobalt-chromium rod designed for spinal implant

Cobalt-chromium rods for the treatment of complex spinal pathologies and procedures have been announced by K2M Inc., Leesburg, Va.

The Range Rigid Rod features flexural rigidity properties comparable to 5.5 mm diameter stainless steel and 6.35 mm titanium alloy. Since cobalt chromium is compatible with titanium, surgeons may have more intra-operative flexibility with various rod offerings in one system.

Also, the cobalt-chromium material is more MRI compatible than stainless steel. The rod provides increased construct rigidity while maintaining the low profile of the taper-lock implant design.

For more information: K2M Inc., 751 Miller Drive SE, Leesburg, VA 20175; tel: 866/526-4171; [www.k2m.com](http://www.k2m.com).

# Picatinny cobalt alloys show promise for sustained firepower



*Far right, engineer Vinny Leto holds one of the various cobalt alloy barrels produced using the flow forming technique. The shortest barrel was the first produced, followed by full length barrels without rifling and later a prototype with rifling like the one that was tested. Other team members, from left, Michael Hespos and Keith Koehler.*

During a firefight, the last thing a machine gunner wants to do is stop fighting to change barrels, but that's how it has always been done with standard, single steel-barrel machine guns.

The reason for the barrel change is that at high temperatures barrels lose "strength properties," according to engineers working on a promising alternative.

One of the engineers is Vinny Leto, systems project engineer, of the Armament Research, Development and Engineering Center, or ARDEC, Weapons System Technology Directorate. During a test firing of a proof-of-concept barrel in December, Leto witnessed a measure of success with the High Performance Alloys for Weapons Applications Project.

During testing, the first rifled, cobalt-alloy machine gun barrel ever produced using the "flow forming" process consistently reached high temperatures without degraded performance.

The proof-of-concept barrel was made of an alloy that contains more than 50 percent of the metal cobalt. Cobalt alloys are erosion- and corrosion-resistant metals that are designed to retain high strength during long-term exposure to high temperatures.

Cobalt alloys are frequently used in the aerospace industry, such as the hot-gas section of turbine engines, explained Leto. Cobalt alloys are also used as short liners for machine gun barrels.

"If you look at steel in a machine gun environment, it gets very hot at a high rate of fire," said Leto. "The benefit of the cobalt alloy is that it is designed to operate in

high-temperature, high-stress environments. It has the added benefits of corrosion and erosion resistance."

While cobalt alloy barrel liners have been produced for years, it is very difficult with existing machining techniques to impart rifling. "The material, for all of its phenomenal properties, is very difficult to manufacture and machine," said Leto.

Different from machining, flow-forming is an advanced process used to manufacture precise cylindrical components. The process consists of high-pressure rollers exerting pressure on the exterior of a cylinder, pressing material against a rod-called a mandrel-on the interior of the cylinder. For this project, the flow-forming process was modified to produce the rifling in the barrel bore.

More testing and data gathering will be required before engineers know if flow forming manufacturing can be achieved with the alloy.

Success, however, would provide warfighters with three potential benefits: lightening their load, increasing barrel service life, and giving them a barrel that could operate at higher temperatures compared to a steel barrel, Leto said.

Soldiers and Marines typically carry spare barrels into battle so that they have a cool barrel to exchange if they engage the enemy in a firefight, explained Leto. Having that strength at higher temperatures means that barrels may not need to be changed during a firefight, eliminating the need for the extra barrel and maintaining a steady stream of firepower.

Engineering team members met all of their proof-of-concept test objectives when they fired more than 24,000 rounds and achieved an 1,100 degrees barrel temperature. Leto said the alloy barrel was fired from the ARDEC-designed Advanced Remote/Robotic Armament System.

Steel begins to lose strength at approximately 1,000 degrees, Leto noted, and the test yielded data needed to assess and design the next round of improvements. The team is planning to produce another prototype that will be fired from a fielded infantry weapon later this year.

Previously, the engineers had produced a half-length barrel as an initial demonstration of the flow-forming process before moving on to manufacturing full-length barrels.

The Office of Naval Research assigned the engineers as principal investigators into the flow forming manufacturing technology. They are leveraging ARDEC's expertise with metallurgy and small arms design and analysis. Prototype testing will be conducted here at the Armament Technology Facility, which is ARDEC's small arms design and evaluation facility.

Previously, the engineers had worked with the Office of Naval Research in development of lightweight 60mm and 81mm mortar tubes made with a nickel-based alloy.

The team is also working with the Joint Services Small Arms Program, which is also based at Picatinny Arsenal. The JSSAP office oversees the day-to-day implementation of the plan by the joint services regarding the development and investment in small-arms technologies.

*This article was written by Timothy Rider, Picatinny Public Affairs and published on the U.S. Army website [www.army.mil](http://www.army.mil) - <http://www.army.mil/article/52605/picatinny-cobalt-alloys-promise-for-sustained-firepower> on 1 March 2011.*

## PNG's Ramu nickel mine in full swing in 2013-Highlands



The US\$1.5 billion Ramu nickel project, China's single-largest mining investment in Papua New Guinea, should be operating close to maximum capacity by mid- to late-2013, Australian minority partner Highlands Pacific said on Tuesday.

The project, the first of its kind for Papua New Guinea, is under development to yield 31,150 tonnes of nickel and 3,300 tonnes of cobalt a year for at least 20 years, but has faced a series of setbacks and environmental protests.

Highlands said commissioning activities were underway after review of the project by PNG's chief inspector of mines and that a beneficiation plant and 136-km pipeline to transport slurry had been tested several times using water.

The mine has been plagued by local protests over plans to dump 100 million tonnes of waste 400m offshore.

A court ruling in Papua New Guinea has already approved the dumping, but an appeal against the decision is still pending.

Highlands said a ruling on the appeal was expected early next year and was not affecting commissioning work.

Highlands holds an 8.56 percent stake in the project. Metallurgical Corp of China leads a Chinese consortium that owns 85 percent, with the rest held by the Papua New Guinea government.

Highlands shares closed down 3.5 percent, outpacing losses of 0.2 percent in the broader market.

The nickel is earmarked for use as an anti-corrosive in stainless steel making in China.

SOURCE: REUTERS/PACNEW

# Geopolitics Impact Cobalt, PwC Study Shows

Manufacturers around the world are expected to face chronic shortages of 14 critical raw materials over the next five years, according to a study by PricewaterhouseCoopers LLP. The report catalogues a group of 14 materials including cobalt, graphite, indium, magnesium, platinum group elements, rare earths, tantalum and tungsten as being at risk of increased supply shortages.

The PricewaterhouseCoopers report titled “Minerals and metals scarcity in manufacturing: A ‘ticking time-bomb’”, Malcolm Preston, Global Head of Sustainability Services, said: “Put simply, many businesses now recognize that we are living beyond the planet’s means. New business models will be fundamental to the ability to respond appropriately to the risks and opportunities posed by the scarcity of minerals and metals.” The report’s main author, Hans Schoolderman of PricewaterhouseCoopers Netherlands, added: “The world’s growing population, an increase in GDP levels and changing lifestyles are causing consumption levels to rise globally – creating a higher and higher demand for resources. Governments and companies should all be aware of the scope, importance and urgency of the scarcity of both renewable and non-renewable natural resources: energy, water, land and minerals.”

Cobalt, a material used in industrial manufacturing for jet turbines and automotive rechargeable batteries and iPhones, is usually produced as a by-product of other metals, typically nickel or copper. About two thirds of the world’s cobalt is mined in Africa, primarily in the Democratic Republic of Congo (DRC), however, nearly half of the world’s cobalt is refined in China with Chinese companies investing to secure cobalt supply from Africa.

## Geopolitics affecting materials supply

Between July and September, the study interviewed senior executives at 69 leading companies in seven different manufacturing industries across Europe, the Americas and Asia Pacific in the automotive, aviation, chemicals, energy and utilities, high tech, infrastructure and renewable energy sectors. Results were tabulated on a Likert scale of 1-5, where 5 indicates high intensity and 1 low intensity.

The analysis found that a breakdown by region showed a high risk in Europe, where seven out of ten respondents (71 percent) consider minerals and metals scarcity as a risk, followed by nearly one in two respondents in Asia Pacific (53 percent) and the Americas (50 percent). Respondents from all regions see this risk increasing over the next five years.

More than four out of five executives interviewed (84 percent) said the increase in demand is seen as the main driver behind the issue of scarcity of these metals and minerals. However, 79 percent also

promptly said geopolitics is just as big an issue followed by extraction shortage (73 percent).

The study concluded that nearly all of the European companies interviewed (96 percent) opined that “geopolitics is another factor affecting industries such as energy, chemicals, infrastructure and automotive.” Further sentiment showed that “How crucial this aspect is can be understood from the recent ruling by the World Trade Organization against China’s rare metals export policy. The United States, European Union and Mexico petitioned against China at the WTO forum in 2009, citing export restrictions on minerals and metals, such as bauxite and magnesium, as discriminating against foreign manufacturers and giving an unfair advantage to domestic Chinese producers.”

China produces nearly 50 percent of the world’s supply of scarce metals and around 97 percent of rare earths. A study in September of this year by the British Geological Society showed that of the 52 metals on the list, 31 have a supply risk index of 5 or higher, where 1 indicates low supply risk and 5 high supply risk. The BGS list showed that China dominates global production of nearly all the elements on the list, being responsible for extraction of more than half of them.

## Increasing risk of supply shortages

PricewaterhouseCoopers’ study showed that the risk of scarcity is expected to rise significantly, leading to supply “instability and potential disruptions in the next five years ... Risk arising from minerals and metals scarcity is expected to increase across all industries in the next five years.”

The survey showed that renewable energy (78 percent), automotive (64 percent) and energy & utilities (57 percent) are currently experiencing instability of supply. The industries which are particularly being impacted are aviation, high tech and infrastructure, all of who believe that a high rise of instability of supply is on the horizon from now until 2016.

The study pointed out that as a range of factors – from demand to geopolitics – contribute to resource scarcity, “it is clear that all stakeholders in the supply chain need to be involved in addressing this issue. Mining companies have a key role in identifying and developing new reserves and managing existing reserves; governments should remove trade barriers; universities and research institutions should accelerate R&D; companies should invest more in innovations for substitution and resource efficiency, and consumers need to take responsibility by recycling waste materials.”

*This article was written by Karan Kumar exclusive to Cobalt Investing News.com and reprinted with kind permission.*

# **ECHA pushes five cobalt salts through for prioritisation for REACH Authorisation... but was this proposal well informed?**

## **What is REACH?**

REACH is the European Community chemical management law on chemicals and their safe use (EC 1907/2006). It deals with the Registration, Evaluation, Authorisation and Restriction of Chemical substances. The Regulation, which is legally binding in each EU Member State (MS), entered into force on 1 June 2007.

The aim of REACH is to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances. At the same time, REACH aims to enhance innovation and competitiveness of the EU chemicals industry. The benefits of the REACH system will be gradually visible, as more and more substances are phased into REACH.

The REACH Regulation places greater responsibility on industry to manage the risks from chemicals and to provide safety information on the substances. Manufacturers and importers are required to gather information on the properties of their chemical substances, which will allow their safe handling, and to register the information in a central database run by the European Chemicals Agency (ECHA) in Helsinki. The Agency acts as the central point in the REACH system: it manages the databases necessary to operate the system, co-ordinates the in-depth evaluation of suspicious chemicals and is building up a public database in which consumers and professionals can find hazard information.

The Regulation also calls for the progressive substitution of the most dangerous chemicals (Substances of Very High Concern, or SVHCs) when suitable alternatives have been identified.

One of the main reasons for developing and adopting the REACH Regulation was that a large number of substances have been manufactured and placed on the market in Europe for many years, sometimes in very high amounts, and yet there is insufficient information on the hazards that they pose to human health and the environment. There is a need to fill these information gaps to ensure that industry is able to assess hazards and risks of the substances, and to identify and implement the risk management measures to protect humans and the environment.

REACH provisions are being phased-in over 11 years. Twice a year substances are examined and if their inherent properties qualify them as SVHCs, they may be selected as potential candidates for listing on the List of Authorised substances (Annex

XIV of REACH Regulation). A substance is assessed thoroughly, evaluated and may be authorised for one or more specific uses. All other uses of the substance which have not been authorised are to be phased out within defined timeframes. The REACH provisions only apply to substances manufactured in the EU market, not to substances that are manufactured outside the EU and subsequently imported.

Should you require familiarisation with the REACH Regulation you are recommended to go to the ECHA website at: <http://echa.europa.eu/web/guest/regulations>

## **The Situation for Cobalt**

REACH has many ambitions and compelling aims to protect EU citizens and workers from exposure to chemicals, and these are supported by Industry. However, Industry is also seeing that there are many unintended consequences of the application of the Regulation which could have major ramifications.

The metals industry has spent several years organising for participation in REACH, by forming Consortia and planning extensive work programmes to fulfil the requirement to have robust Dossiers Registered with European Chemical Agency (ECHA). Significant funds have been committed towards fulfilling REACH obligations, and there are expected to be substantial further costs for Industry.

## **The Prioritisation of five cobalt salts**

It has therefore been with much surprise that the ECHA should select five cobalt salts to go forward for prioritisation from the Candidate list of Substances of Very High Concern (SVHC). As you will appreciate from the following article, cobalt salts have very limited uses (being mainly a precursor to the production of other chemicals – a so called 'intermediate'), are not used in a widely dispersive way and there is negligible exposure to consumers as cobalt salts are not found in final articles.

For the last 18 months, the Cobalt REACH Consortium (CoRC) and the Cobalt Development Institute (CDI) have worked relentlessly to support five cobalt salts (cobalt sulphate, -diacetate, -carbonate, -dinitrate and -dichloride) through the REACH prioritisation process, since ECHA's proposal to prioritise them for Authorisation under REACH. The salts had been nominated as potential SVHC candidates by

two Member States (France for cobalt dichloride in 2008 and the Netherlands for the four remaining salts in 2010).

Should ECHA's proposal be accepted by the European Commission (EC), the five salts will eventually have to be substituted by other substances, except for the specific uses that will have been Authorised with defined review periods. This could have a major impact on the industry sector and may adversely affect the innovation platform and green agenda of the EU because cobalt is an important part of these developments. During a period of a major economic recession the timing or reasoning could hardly be worse.

ECHA had based its proposal on 'background documents' on each salt, which were then, in accordance with the procedure, submitted to a Public Consultation (3<sup>rd</sup> Public Consultation open from 15 June to 14 September 2011). These background documents (<http://echa.europa.eu/web/guest/draft-recommendation-of-priority-substances-for-inclusion-in-the-list-of-substances-subject-to-authorisation>) were disappointingly very superficial and mostly outdated and/or erroneous. They certainly did not reflect the complexity of the supply chain of the five cobalt salts and the importance of cobalt as a technology enabler for resource efficiency or as an essential oligo-element. Industry and its Downstream Users provided their comments both as individual companies, as the Cobalt REACH Consortium (CoRC) and the Cobalt Development Institute (CDI).

To enhance the understanding of the supply chain, the CoRC also completed a stakeholder mapping survey during July-August 2011, which enabled the collection of further data which were subsequently shared with Member States and ECHA during the consultation process. This was important because ECHA uses a 'scoring' method to determine the eligibility of substances by measuring components such as: intrinsic properties (PBT/vPvB); wide dispersive use (WDU); and volumes. Data collection and analysis continued throughout 2011 – and still continues today, even after the close of the Public Consultation- and it rapidly became apparent that:

- the Public Consultation has given very little time for the many potential Downstream Users (DUs) to appreciate that cobalt salts are an essential precursor in the products they require, let alone gather the necessary information in several of their specific sectors
- the background work regarding prioritisation of the five cobalt salts for Authorisation previously undertaken by ECHA still does not reflect the current situation due to the availability of new data on the in-scope applications

The information gathered through our stakeholder mapping exercise enabled industry to clarify the following main points:

- **The majority of the uses of the 5 salts (> 86% overall, and > 95% for four of the salts, excluding cobalt diacetate) are as intermediates and therefore out of scope for Authorisation.**
- **Tonnages of salts in the market were previously overestimated, and are low-ranging, in particular for the in-scope (non-intermediate) uses** (in some cases up to 20 fold). Certain uses, considered as intermediate by industry (such as surface treatment), at the request of ECHA were included in the volume under scope to reassess the scoring, but this did not significantly change the scoring results.
- According to the exposure scenarios developed by the CoRC for REACH, **“safe use” can be demonstrated for all uses of cobalt salts**, even assuming worst case exposure from dusty solids. Therefore **the Risk Management Measures in place render workplace releases insignificant.**
- **The salts should be considered threshold carcinogens to which worker exposure is already controlled so that risk is already minimised.**
- Cobalt salts are not present in consumer products so exposure here is negligible.
- The definition of 'wide dispersive use' (WDU) as set by ECHA has not been followed accurately during the evaluation process. According to the guidance, based on release and wide-dispersive use, it can be reasonably concluded that **releases resulting from the use of the five cobalt salts recommended for Annex XIV are either controlled, or insignificant. Some uses of the cobalt salts could be considered wide-spread, but not widely dispersive. The scoring set by ECHA does not reflect this.** This was a key point of discussion which caused considerable confusion during the final Member State Committee (MSC) evaluation discussions.
- Interchangeability between the five salts was assumed by ECHA when considering prioritisation. **However automatic interchangeability does not apply to many uses based on the inherent chemical properties of each salt and therefore this was a wrong assumption at the onset of the process.** Many examples where cobalt salts would not be interchanged for technical reasons were shown albeit in a summarised manner. ECHA have dismissed all reasons provided by manufacturers and downstream users whilst providing no robust explanation for their position except for the lack of more detailed technical information. However, these technical details could not realistically have been provided within the given timeframe.

- ECHA has not considered any of the several requested **exemptions** to be justified, despite, for example, cobalt being an oligo-element used for its essentiality to humans and animals, and the extensive existing EU legislation on which basis Industry is currently operating under controlled conditions.

All the above considerations lead to **question the regulatory effectiveness and proportionality of the measure**. Indeed, on one hand cobalt salts remain minor in terms of volume and the uses potentially in scope of Authorisation concerning only a small percentage of the overall volume of cobalt salts (< 5% for four of the cobalt salts and <14% taking into consideration the cobalt diacetate): authorisation would not significantly improve human health given the legislative measures that are already in place to control occupational exposure and the lack of consumer exposure.

On the other hand the cobalt supply chain is very complex, and cobalt is in many aspects a technology- and resource efficiency-enabling metal, which has been identified as a critical raw material by the EU (and indeed by the USA).

On this basis, the Cobalt Industry has requested to be given the opportunity to finish collecting key information, and that sufficient time is allocated for Regulators to evaluate these data thoroughly before a decision on the prioritisation of the five cobalt salts is made.

### **ECHA recommends the inclusion of five cobalt salts in the List of Substances subject to Authorisation**

Despite the above considerations, and taking into account the MSC opinion, ECHA maintained, on 20 December 2011, its original proposal to include *seven chromium compounds, five cobalt compounds and trichloroethylene* in the Authorisation List (Annex XIV, the list of substances subject to Authorisation).

The majority of the MSC members supported ECHA's draft recommendation to include all compounds in Annex XIV. However, due to a significant minority opinion from the MSC, the MSC meeting discussions were prolonged in an unprecedented manner and finalised in a closed session, with the formal adoption of the opinion taking place under a written procedure.

One minority opinion from three Member States (France, Latvia, and the United Kingdom) opposes the prioritisation of the five cobalt salts, and highlights the need to fully assess the additional information provided by the industry. These countries propose to set up a working group with industry and independent experts.

A second minority opinion objecting to the prioritisation of cobalt diacetate is supported by five other

Member States (Poland, Lithuania, Slovakia, Italy and Spain). If cobalt diacetate is not a substitute for the other cobalt salts it should not be prioritised. Without further assessment these countries state that they cannot support the inclusion of the cobalt group of substances.

### **Next steps**

The Recommendation aims to assist the European Commission (EC) in taking its decision pursuant to Article 58(1) of the REACH Regulation to include substances in Annex XIV of the REACH regulation. It has now been transmitted to the EC for DG Enterprise and DG Environment to jointly draft their recommendation for the legislative text proposal. (Please refer to [http://echa.europa.eu/view-article/-/journal\\_content/84f13bf9-d6fd-41ee-aeeb-cdf2e7e9cdee](http://echa.europa.eu/view-article/-/journal_content/84f13bf9-d6fd-41ee-aeeb-cdf2e7e9cdee) for details).

Although the disappointing result is that ECHA's recommendation for all five salts to be prioritised is going forward, the procedure is not finalised yet and the Recommendation will be subject to a 'regulatory procedure with scrutiny' during the next 9 months. The next stages of the procedure lie mainly under the realm of the EC but will also involve a notification to the World Trade Organisation (WTO) including a 60-day period for comments. The EC will be aided in their scrutiny by an 'Article 133 Committee' (in this case the 'REACH committee') to evaluate ECHA's proposal. The final EC Decision will be voted by Qualified Majority and is expected to take place end 3Q or early 4Q2012.

Though not the result hoped for, the presentation of information by the cobalt Industry increased the level of understanding of the supply chain relating to the five cobalt salts and their various uses, and will be a good starting point for further awareness-raising activities across the EU. However, certain key definitions remain unclear, and it is hoped that the EC will contribute to their resolution.

The CoRC and the CDI are currently establishing a strategy to respond to the legislative proposal and to the concerns of the EC, the MS and WTO over the next 10 months, when the EC Decision is due.

*Should you or your company require more information about the position regarding the prioritization of cobalt salts and how you can be involved in the process, please contact the CDI by mail:*

brigitte.amoruso@thecdi.com