In 2021, CANADA developed a list of 31 MINERALS AND METALS deemed critical to developing a low-carbon economy, maintaining domestic industry and security, and providing exports to our global partners. Called "critical minerals" these minerals and metals are, or can be, produced in Canada. They are necessary for:

- Renewable Energy Technologies
- Manufacturing
- Aerospace and Defence
- Information and Communications Technology
- Agriculture
- Health and Life Science Applications
- Infrastructure

7.6 ΔΛ 2021 6ΡΡΟΔ.σ.Δ, δας ΔΡΟΓΛΔα 31 νσ. Δ. σ. 64 Λ·ΔΛΔΦ ΒΡΓΦ<Cba LαλρΠδΦ ΦΥ·Δ ΡΩΥ·ΔΦLLΘΥΡΦ 90°P ~05769a5.46, Pad6P6UPa PPad6P6Fda, 64 PDanal9L66 ΓϤϧ∾·ΔCL·ΔΦ·C δ·ΔCΦΡΓΠ·ϤϤ. ΔΛσδΟυ-ϤΦ δΡΟΚΠΥ-ϤϤ Νσ-ϤΥσΦ, Dd ~σ5·47σ6 b4 Λ·4Λda, 9L b4 CPDar DsrbU·4a bac 4P6. ΓΡΔΦ<Cb ΤCν:

- ρσγν ακοδο Φρηθο Ερρ
- PVL>~LPA 6900
- Φ</l>
 Υ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 Δ
 • •ΔΦCL9•ΔΦ 64 ΡΡΟ•ΔΦΦ 65/Γ6UPΦ
- ρηφ.Δ 9σσσ
- Γλουν σσο Ορουσο
- ΓLC·∇ Φοδ·∇σσ

Mining Makes It Happen! 4259.256 Derle rorlreges.46!

MADE IN CANADA **Р**ФС **ЧЪР Р**Ф**СРСР**

TAKE TO THE SKIES AYAL PAGSALOUS

BEFORE AN AIRCRAFT TAKES TO THE SKIES, EXPERTISE GOES INTO ITS DESIGN, CONSTRUCTION, AND OPERATING AND SUPPORT SYSTEMS

According to the Aerospace Industries Association of Canada, Canadian companies' cutting-edge innovation and technology have that covered.

Critical minerals are essential to the aerospace industry, going into the wide range of products made in Canada, including regional, business, and firefighting aircraft; helicopters; and satellites.

Also produced are numerous aircraft parts, including engines, navigation systems, specialty alloys, landing gear, air traffic control systems and equipment, computer equipment and software, defence systems, simulation and modelling technologies, and more.

Aluminum, Antimony, Chromium, Cobalt, Copper, Graphite, Gallium, Germanium, Indium, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Platinum Group Metals, Scandium, Tantalum, Tin, Titanium, Tungsten, Vanadium, Zinc

 $d\sigma L \cdot 4 \Lambda \Gamma \Delta \circ \Gamma \cdot < \Delta \circ < 2 \Gamma b = \Delta \circ L b = \Delta \circ \Lambda \Gamma b$, $\Lambda a L$ **Ρ**Cσ**Ρ**√Ͻα·**Ϥ**, **b**4 **Ρ**Cσ **b**·**9**ΓϽα·**ປ** ·**∇**·**∇**σ ΓΛΓ**Υ**L**b**σ**b**

ουμρα συρσορ ρουρος . Ασισ σας δροσοσία αλτισος.

 $\triangle P \cdot \triangle P$

Γα·Ϥ Δσ < Λ·σοδίλα Δν</>
Αν</r> የየው Δ baa, ለ፡ Δ ለda, > σ · Δ a የየ α · Δ </br/>
የኮው Δ baa b Δ Γ/>
አይየል b $a \cdot b P^a A < C b^a$, LLbC Λ^b A < CC b^a b4 b D P A D P Lbb, D N σP a CL A c A c, ΡΡα·Ϥ<Γ9·Δα• 64 6α5ΛασΓ6ΟΡ• ΦΥΓ9·Δα•, 64 95Λ σΕΡ5•.

 $\mathsf{L}^{\mathsf{a}}\mathsf{b}\sigma^{\mathsf{t}},\;\cdot\mathsf{L}\mathsf{C}^{\mathsf{c}}\mathsf{U}\mathsf{a}^{\mathsf{L}},\;\cdot\mathsf{d}\Lambda^{\mathsf{t}}\mathsf{P}\!\!\circ\sigma^{\mathsf{t}},\;\mathsf{b}\mathsf{L}^{\mathsf{o}}\mathsf{b}\cdot\mathsf{d}\Lambda\mathsf{b}\mathsf{P}\!\!\mathsf{a}\;\;\Lambda\cdot\mathsf{d}\Lambda\mathsf{d}\mathsf{a},\;\mathsf{t}\mathsf{b}\mathsf{a}\mathsf{D}\mathsf{b}^{\mathsf{L}},\;\mathsf{C}\mathsf{a}\mathsf{C}\mathcal{L},\;\mathsf{D}\mathsf{a},\;\mathsf{C}^{\mathsf{b}}\mathsf{U}\sigma\mathsf{b}^{\mathsf{L}},$ CaptUa, CaUPL, Yab

A CLEAR MESSAGE <ρδς-ρσ •∇σCΓδ•∇σ

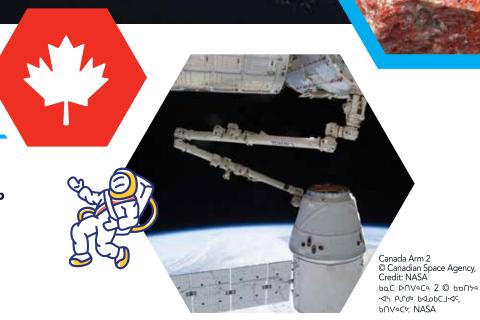
THE 21ST CENTURY HAS SEEN AN **EXPLOSION OF INFORMATION AND** COMMUNICATIONS TECHNOLOGY (ICT) **USAGE AROUND THE WORLD**

Numerous critical minerals go into the equipment that transmits and receives communication and data signals. From cables to broadcast towers to networks that send radio signals, critical minerals are integral to their makeup. The electronic devices designed to receive those signals comprise numerous critical minerals that enable high-speed performance and data, along with vivid, high-resolution screens.

Aluminum, Cesium, Cobalt, Copper, Gallium, Indium, Lithium, Magnesium, Manganese, Nickel, Platinum Group Metals, REEs, Tantalum, Tellurium, Tin, Tungsten, Zinc

 ∇ D Γ CDQ Φ • Δ Φ CLQ Φ b4 PP Φ • Δ Φ Φ DPLbP Φ

 $< \mathsf{ND} \cdot \mathsf{Ap} \ \mathsf{Pd} \ \mathsf{PbLd} < \mathsf{NL} \cdot \mathsf{Ac} \ \mathsf{PdLpp} \ \mathsf{Pd}$ LΓσ⁶6L66 ΡΡΟ·Δο 64 ·ΔοCL9·Δ <</br> δρου Δασινοθίο Λλουθο οννλυβαο, ΓρΓ Διδεςυμογορο ο. Δυργορίο βιαριστικό το μετιστικό το μετισ $\Delta < U^{\circ} <$ Γ<6Ρα.6Ρα LλαΠλιρανα.



In 2020, the Canadian Aerospace Industry contributed

7.6 4A6 2020 6PPD·AJ·46, 65A54 Δ°

OVER \$22 BILLION TO CANADA'S GDP

4.4√7 \$22 ∧c/4 bac \sim σ \rightarrow 9 \sim 9 σ 9 \sim 9 \sim

OVER 207,000 JOBS TO THE CANADIAN ECONOMY

96 207,000 Jopa.V.Daa PLCCL9aoda DDL bac





According to the Canadian Wireless Telecommunications Association, in 2020, that industry contributed

ρρωνδαφ 6νδςωργηνος, 7ν6 ΦΛυ 2020, Р<Р∩σ9∙⊲७

UP TO \$70.7 BILLION TO CANADA'S GDP

4.4√7

\$70.7 Acta bac ~0749·A <·909·A



⊳ΛΓ∙Δ⊃6СΦ• 600,000 dop.da

PEDAL TO THE METAL **DCくわち** $bD \int db \sigma \cdot \Delta \cdot d^{c}$

1,358,657 VEHICLES The Canadian Vehicle Manufacturers' Association stated this number of vehicles was produced in Canada in 2020, contributing over \$16 billion to the GDP.

AUTOMOTIVE MANUFACTURING IS VITAL TO

1,358,657 ▶<< 5 5 6

THE CANADIAN ECONOMY

ρουγο ∾αρδιγορ

δροναδσ·Δ·ας ρεζος δαε αρώ, ρραρ ·Δορημδα α·αντ \$16 Acta ~0t9.0 <.909.0a.

OVER 500,000 JOBS

The auto industry is responsible for direct and indirect jobs across Canada. Vehicles are Canada's second largest export by value.

4·4√7 500,000 **ব**ϼΡ·Δ**α**٩

PC<079 DDP\D0 POP POP POP PPOPC 40DA-9C4 PPOPD PFG Γγ·νοΓο δας αρο. Ος<ολο δοναδο.Δ.ας δας αρο σ.ω Ε.αι σΛ. Ο Υ< βα δρα δρινστασισό.

The automobile industry relies on critical minerals. Transitioning to environmentally friendly vehicles demands lighter auto bodies and parts using high-strength steel and aluminum alloys. Cleaner transportation uses electric or hybrid vehicle batteries, which require numerous critical minerals.

Aluminum, Antimony, Chromium, Copper, Graphite, Lithium, Magnesium, Manganese, Nickel, Platinum Group Metals, REEs, Scandium, Tellurium, Tin, Vanadium, Zinc

DC<040 PD@L D\dpa.V.dc d<LLP4.4p PbL@<U5.4c ~σ>·>></t bρορ ρυαραγαί Λίρο ρυστυτίας σαριαία.

٩٤٦٩. ٩٩٩٠٤٦. ١٩٩٢٤، ١٥٥٩, ١٩٩٢، ١٥٥٩. ١٩٥٤، لهمكابا, لعلم، Uے Λ کL, Λ e, $\langle \alpha \Lambda \rangle$ L, Λ eb





CANADA'S MINERALS AND METALS SECTOR CONTRIBUTES, NOT ONLY TO THE SUCCESS OF OUR OWN ECONOMY, BUT ALSO TO ECONOMIES AROUND THE WORLD. Natural Resources Canada states that the sector supplies ores, concentrates, and semi-fabricated and fabricated metal and mineral products to over 100 countries.

<code>bac</code> dP^b vot י d d የ∾σታዓ \cdot Δσ2, Cd ዓ \cdot Δ21 የ \cdot Δσ14 የ \cdot Δσ15 Γν15 Γν**baC βΔβϽ·ϤϷ ∇ΛΓ<βΠα·ϤϤ ϤͰϭϷ ϧͽϭϧϧθασ·ϤϷ, ϧϸϭͿʹͰϧͰ·ϤϤ, ϒ<β ϧϸϭͿʹͰϧϢ**Ϸϫ b4 b▷ፓՐԵ∪₽º ለ∙₫ለ₫º b4 ₫₽σ₺⁰ b▷በσ₺∪₽º ₫∙₫ፓႨ 100 V<bን ₫₽º.

OF CANADA'S TOTAL \$582 **BILLION OF EXPORTS IN 2021,** \$127 BILLION

were metal and mineral products.

baC ⊲₽ Гσ**д** \$582 ለርታቁ C·5ለ\$ <ba ላቦ\$

\$127 ACYG CYAN 64 47Gbb 6DNG6UPa derchas.



CANADA'S PRINCIPAL TRADING PARTNERS FOR MINERAL COMMODITIES IN 2021: bac <> Pb Lb $b \cdot \Delta C \triangle PL \cdot d^{C} L \exists \circ \cdot b \Gamma d C \Gamma \cdot \nabla \cdot \Delta \sigma^{b} \Lambda \cdot d \Lambda d b \sigma d \Delta P \cdot \Delta \sigma^{b}$ 7·b 2021 bPP⊅·∆♂·◁७:

States Γσθ ΔΔΙ

United Kingdom PaCr ⊲PLPP



Other significant markets for Canadian metals and minerals include China, Japan, South Korea, Germany, Norway, and Switzerland.

dCP>6 bdCΓ·V·dc DDL bac Λ·dΛda b4 drσa ·VN υδα, υ<α, ω∙δρο ιοπό, υΕσ, ιαίιν οι νιΔιίσα δρα.

CANADIAN CRITICAL MINERALS שםחלים שפריכוריסי מסליסלסי

Canada produces and supplies domestic and global markets with a variety of critical minerals. Canada is the leading global producer of potash and ranks amongst the top five global producers for aluminum, cobalt, indium, niobium, palladium, platinum, tellurium, titanium concentrate and uranium. Canada also hosts many advanced mineral projects, including for key commodities such as rare earth elements, lithium, and vanadium.

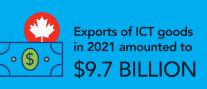
bac 4Pb Denabo.Δ.« bDJ4bo.Δ.« b4 ΛCLbo.« DDL V» b4 Γ.·7bΓb bdC·dr·dc V<ba bPC<Nr·dc ασγ·drσ6. bac dP6 σbσLb4 bDJPbU6 ·<C6 b4 σοσμος σα∙ος Γγ∙δρις ρογιρης α⊃ιαί, α<ς, δουλί, α4γλί, <⊂υλί, <⊂υαί, υυπλί, Γίνυσλί βιλιάδο βά τραλί. Γαία βας αρό δυαρασός από

CANADA ALSO MANUFACTURES AND EXPORTS PRODUCTS THAT INCORPORATE CRITICAL MINERALS bac app by capardua by approximations. **ላ**ውኒላር・ላላ・ላፆ የbbダ<ሀኣ・ላር ላላውፆ

Vehicles were Canada's second largest export by value in 2020, totalling \$42.9

PC<04 bac are bcs ⊳√◊bσ·Δ·◊¢ σ·∞ σbσLb٩ $dbLPb b\sigma \mathcal{J}dbC \cdot dC \cdot dC$ **¬**⋅ь 2020, LL°

\$42.9 ACTO C'SAD



<be dPb $b\sigma \mathcal{N}dC \cdot dPbUPe$ $\cdot \Delta$ \circ CL9 $\cdot \Delta$ \circ b4 PPD $\cdot \Delta$ \circ \circ ₽₽₽₽₽₽ **1.**₽ 2021 $P \sim G + 9 L b =$

\$9.7 ACY CYAN

The Canadian aerospace manufacturing industry exported over 75% of Canadian aerospace products to 186 countries across 6 continents in 2020.

 $\phi \Phi \nabla \phi = \Phi \Phi \Phi \Phi \nabla \phi \nabla \phi \nabla \phi \nabla \phi$ ᲡᲥᲐᲥᲡᲙᲘᲑᲘᲡ₼ ४.୧୯. 12% ᲓᲔᲡᲑᲑ 186 4Pbb 6 4bLbP NVarg4Pb 7.6 2020.

Relating to zero-emission goals, a 2021 ranking by Bloomberg's clean energy, new predicts that Canada will be in fifth place in the global lithium-ion battery supply chain by 2026.

2026

Ր•ΔσՐ9Lbrው < U ხხ•9 ΡΛΛσხυს, Τ•b 2021 $\Delta \Delta \Gamma < 2r >_{2P} U < b \sigma U + 3r \sigma U$ bac op a.a plaghs bac F.VbFb bdan ρρα·<

Ο

Ο

Ο

Ο

Ο

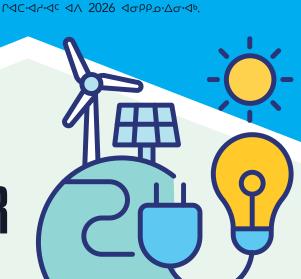
Ο

Ο

Ο

Ο

Ο<



CARING FOR THE PLANET

 $\Delta \rho \sigma \cdot \Delta L \rho \Pi \rho \Delta b$

CLIMATE CHANGE IS CONSIDERED ONE OF THE BIGGEST THREATS FACING OUR WORLD bo<
bo As·V

o dar abana respense ΡΟΡΓασι

To fight that threat, Canada, along with over 120 countries, has committed to reach net-zero GHG (Greenhouse Gas) emissions by 2050. Canada is already a world leader in the production of clean electricity, with 82% of electricity generated coming from non-GHG-emitting sources, including hydroelectricity, nuclear power, and wind and solar PV (Photovoltaic) power installations. But more power will be needed, especially as we move to cleaner transportation. The transition to a net zero future depends on the availability of critical minerals.

ቦር・bł」ው GHG (bለቦ>・d<ቦ9៤๒) Δ^{ω} ለ୮๒ bለL<U๒ · ∇ በ 2050 ddpp. Δ ታ·d๒. >>L bac dp๒ 46 sbsld Vd/rbub 82% b<4bb Δ^{ω} du GHG bd/flbb, prPr/bd Δ^{ω} du, b4 dna b4 ₽ፖሪቴ ቴኦቦ ሲቦለቦዓ៤ቴ Δ 64U ·45ቦቴሲለ₫ ቴ CP4Vσ1Qσ·4° ΓC·6Ρ° 6PC<ΓΓ6Α·4° ~σ5·47σ6.

ΓΡΓЬΓЬU⁶ ▷▷·▽ baσha⁶, bac cd b4 dcpha 120 <b4 dpa, p<pnσn/d⁶ °b·9u/νσьυ⁶



HYDROELECTRIC POWER, produced by turbine blades turned by flowing water, is reliable and cost-effective. It is the world's largest source of renewable electricity generation, and Canada was the world's fourth largest hydropower producing country in 2020. Hydropower from Canada's rivers provide nearly 60% of our electricity. Copper, Aluminum, Zinc

P<\Deltabσ^{\circ} b^{\circ}PC^{\circ}DPL^{\circ}D^{\circ}DPC^{\circ} by pia sample between the post of the property and property are property and property and property and property and property are property and property and property and property are property and property are property and property and property are property are property and property are property are property and property are property and property are property and property are property are property are property and property are prope <code>bPՐ⊄ΔΡΕδθ</code>, b4 bac <code>ϤΡθ</code> σ·Ϥ <code>PՐσδσΕδθ</code> Γσθθ <code>bϤΛCδΓδθ</code> ϤΛΓ ∇Γωθ <code>P<Δδσθ</code> <code>bΡΓΦΔΡΕδθ</code> Δ9dU 7.6 2020. ΡΡΙ ΒΡΓΦΡΙΙ Δ9dU 6aC ΡΥΛΓΙ ΡΦΓΙ6α 96 60% Ρ<Δ6σι 6ΡΓΦΡΙ6 Δ^{ω} dU. Phan, adral, 200



WIND TURBINES use the power of the wind to generate electricity. Between 2011 and 2021, global wind energy capacity nearly quadrupled. In 2021, Canada ranked ninth in the world for installed wind energy capacity. According to the Global Wind Energy Council, the world needs to install wind power three times faster over the next decade to meet our net-zero goals. Copper, Molybdenum, Aluminum, REEs, Zinc

PJ·ba d<rrbu PDab DDarlbb A5du. J·b d∧ 2011 ddab 2021, r√v b∧cbrbb δρα<γγασια γσ·δαγγδα 96 αν αιαντ σις δρ αφρα<γγασια. Τις 2021, δας ναφις የσቴσ%blbe bd<CPa ውበe ቴኦቦኦ/የባlbb Δ %dU. የ Δ የጋነላ $^{\circ}$ Γረ- ∇ bΓb ውበe ቴኦቦኦ/Րባlbb Δ %dU $b \triangleleft b b C J \cdot d^c, \ \Gamma f \cdot \nabla b \Gamma^b \ d^a C \cdot \nabla C \cdot b^a \ \Gamma D a P D \cdot d^c \ P \sigma \cdot b a f \Gamma b a \Gamma d^a \ d \cdot d \Gamma T \ \Gamma d \wedge \Gamma P \wedge C \wedge D A P D$ PJ-badh-de $\nabla \cap$ Jb $\nabla \cap \cap$ Db $\nabla \cap \cap$



SOLAR PHOTOVOLTAIC (PV) TECHNOLOGY converts the sun's energy to electricity. Solar PV provided 3.1% of global electricity generation in 2020, the third-largest renewable electricity technology behind hydropower and onshore wind. In 2020, Canada ranked 22nd in the world for installed solar energy capacity. Copper, Gallium, Germanium, Indium, Molybdenum, Titanium, Platinum, Tellurium, Zinc

ΡΥΤ' ΒΡΑΓ'ΔΟΛΓΊΙΒ Δ'ΟΟ 'ΔΙΓΒΑΛΟ ΒΟΚΙΡΑ (PV) ΡΑΓΡΟΌΣΙΒΑ Δ'ΟΟ ΡΤ' Β'ΔΙΟΘΟ. ·ϤʹΓΡΕΔΛ ΡΡΓΡΥΡΙΘΕ 3.1% ΓΖ·ΥΡΓ ΔΟΝ ΤΗ 2020 ΒΡΡΔΙΔΟΙΝ, ΟΥ ΡΡΓΟΒΟΙΙΑ b4 ρσ∙δαγγόσΦ δργαώριο Δ∽dU. Τ∙δ 2020, δας δραλγόα 22 γγ∙δόΓΦ δ<γαίγας νώ



NUCLEAR ENERGY is an important part of Canada's economy and energy mix. Nineteen Canadian CANDU reactors provide 15% of Canada's non-GHGemitting sourced electricity in 2019. About 440 nuclear power reactors around the world provide 10% of the world's electricity; over 50 reactors are under construction. The International Atomic Energy Association expects world nuclear generating capacity to double by 2050 to meet the net-zero emissions goal. Copper, Iron, Nickel, REEs, Uranium

ΡΓ<Ργοσ Δ°dU ΔΛΓ ΡΓα<Ca DDL bac ~σ59·Δσ6 64 Δ°dU< GHG Δ⁹dU Τ·6 2019. Δ·ΔνΤ Lρ·6 440 ρΓ<ργόσ Δ⁹dUbΓda Γγ·∇bΓ6 Δ5·Δ2 ∇Δ<CPa 10% Panalalba fyvdbtb Δ^ω du bakcb, afant 50 cyda lrfvkabaa babup dyrbupa. σ·ω Διάντ γσά<τρα 2050 ασ ρρώδσιαν γυλσουν γιδσγαιδλών δυθυλσουν. Εξίσκο, ακίς, b·4/\b/bb, 4/\b/b/b/a/a/a 4/b, 4/a/bl



ZERO-EMISSION VEHICLES (ZEVs) are the way of the future. Canada aims to have ZEVs make up 100% of new cars registered by 2035. According to the International Energy Association, there were 10 million electric cars operating globally at the end of 2020, but 230 million by 2030 are needed to meet zero emission goals. Those vehicles rely entirely on batteries; lithium-ion batteries currently power most electric vehicles. Antimony, Cobalt, Graphite, Lithium, Nickel, Magnesium, Platinum, REEs, Tantalum, Tellurium, Tin, Vanadium, Zinc

Γ/2dΔα·C ΣΟΡC<αι 4Λ · ΤΩ 2035 ΡΡΔιΔσισίο, ΡΔΡΟισίο Γινθοίο βισδισδίο βισδισδίος. P45.46 10 Fc5e 64<C7D6 65 DC<056 P4<A7.46 60>056 2020. 006 230 Fc5e $\mathsf{Cd}^{\mathsf{L}}\mathsf{C}^{\mathsf{L}}\mathsf{D}\sigma\cdot\Delta\cdot\Delta^{\mathsf{L}}\mathsf{P}}\mathsf{P}^{\mathsf{L}}\mathsf{P}^{\mathsf{L$ له ۱۳۵۲ د ۱۳۵۲ ما ۱۳۵۸ ما ۱۳۵۸ ما ۱۳۵۸ د ۱۳۵ د ۱۳



CAOd Daral by Yap Drap. DDL pac dbp aparlba **ρσς αρφ ςρ∙α<σςσα∙Δ ιγ∙Δριφ ασφ Δουρηφί**



CRITICALLY CANADIAN PC<Ca bonta



·<657C

Aluminum عاده (Al) BC, QC

A lightweight, silvery metal refined from imported bauxite, aluminum is durable and resists corrosion. Easily shaped, cast, and machined, it is used extensively in the automotive and aircraft industry, as well as in construction, electronics, and packaging.

 $a^b h^b$, $A^b h^b$ $b h^b h^c$ $b h^b h^c$ $PP \cdot \Delta P \cdot \Delta P \cdot \nabla P \cdot$ b>νΔα·C >C<το\ο 64 ΔΥ<γγραα. 64 ·ΔοΔ9·Δσο. Δ⁶dU·ΔλΛ9·Δσο ος δα⁶ραρ9·Δσο.



Stibnite ነበ<وንር

Antimony <a ^ Lo (Sb) NL, NB

A lustrous, grey metalloid sourced mainly from the minerals stibnite and jamesonite, antimony is widely used as a flame retardant. It is an important alloy metal in lead-acid and lithiumion batteries, multiple military applications, and tungsten steel. It goes into semiconductors, circuit boards, electric switches, fluorescent lighting, and high-quality clear glass.

Γ·ΦΛΡΥ, •ΦΛΥΔ LbU•ΦΛΡΥ ΔΦΔbΥ bb•Πσς ~σን•ΦΥ• ΥΠζΦ 64 ηγησής, Δεη·Lσ Δαζηγον γυρυγρο 9de. ργαζία DD·V $\Lambda \cdot \Delta \Lambda d^b$. $\Delta \Delta L$ $\Delta \mathcal{N} d < C^a$ $L \cap \mathcal{N} < \Delta b a^a$, $b \cap \mathcal{N} b d \sigma b U^b$ $\Delta^{\mathcal{N}} d U$,



۷۲۲۷ σ۶ς

Bismuth ∧5L⊂ (Bi) BC, NT

A crystalline, white metal that oxidizes to multiple colours, bismuth is found in the minerals bismuthinite and bismite, but mostly recovered as a by-product of lead processing. It is used in medicine, cosmetics, low-melting alloys, fire detection/extinguishing systems, and in bullets. Bismuth also substitutes for lead in non-toxic alloys.

ΡοΠαόσιδ όδυσης λίλησις ός λίλις, ός ροησόσιδ ∇ PCP\$CPU\$ \$\text{bLbU:4}\$ \$\text{A}\$ \$\text{A}\$ \$\text{C}\$. \$\text{A}\$ \$\text{C}\$ \$\text{d}\$ \$\text{b}\$ \$\text{L}\$\$ \$\text{B}\$ \$\text{L}\$\$ $L^{\circ}PP$, $\cdot d \cdot \nabla \mathcal{J} \triangleright e$, Vb $b \sigma P U P e$ $\Lambda \cdot d \Lambda d e$, $b \cdot \Delta e P Q L b e$ Q d e b U P U e,



>ځځد<

Cesium Yrr (Cs) MB, ON

Silvery gold, soft, and ductile, cesium is extremely rare globally. It is found in granite pegmatites containing the minerals pollucite and lepidolite. Used in drilling lubricants and radiation monitoring equipment, it is also vital for atomic clocks, key to mobile networks, GPS, and the Internet.

ΥΥΡ^ι ΓΥ∙∇ЬΓ^ι Β∙Δ^ι ΦΛΓ ΦΡΥ. ΔΔL ΔΛΓΡ·ΔΡΔ·Ο ΔΥΔΡρ ΛρΓς ΡΟΛΛΔΡς ΜΦΡ·ΔΛσ > 2726 b4 ¬Λ)ς. Δα<ργρι <σοδρα >γνραρα ρη οιςιρα Δ<ΓCbσb, b4 PC<ΓΓbU Δ·CΓb PYYbab bbΓDνΔα·C, PPD·Δα·</p> b▷Ր▷√ՐԵ∪ΡΦ, ΡΡΦΥΦ∙ΔΦΦ ΕΕΕΕΕΛΦΦ Β▷ՐΦΦΡΕΕΡΦ.



Chromite ϧϥͺϧϲ

Chromium BC, ON

A lustrous, hard metal, chromium occurs mainly in the mineral chromite. It is tarnish resistant and takes a high polish. Chromium goes into stainless steel, highly resistant to corrosion and discolouration. Chromium alloys are used to plate auto parts and appliances and as superalloys in jet engines. Chromium is also a component of pigments used in paints, dyes, and stains.

 \neg 4 \upbeta 7 \upbeta **ΒΔΓΛΙΛΡΓ** Νστισια βΩΙτ. **Β**.Δα Γ<!-- Comparison of the comp $bL^{\circ}b\cdot \triangleleft^{b}$ $\Lambda\cdot \triangleleft \Lambda^{b}$, $b\cdot \Delta^{a}$ $\Gamma\cdot \triangleleft \triangleleft \triangleleft^{a}\cdot b\Lambda P^{\circ}bLb^{b}$ b4 $b\cdot\Delta^{\mathbf{a}} \quad \text{Pdera}\cdot b^{\mathbf{b}}. \ \ \text{Perb}\text{sub}\cup \text{Pde} \quad \text{Pdera} \wedge d^{\mathbf{a}}$ $P\Gamma\Delta^{\circ}$ L\G^{\sigma}b\Gamma\b\Gamma\cdot\D\Gamma\cdot\Ga √∾Δbα>٩, ⊲ΠγραΦ ρξ αςδρΦ <ρΦ 40460



Cobaltite

ط۰<ے کہ

Cobalt ♂ · < c Co ON, QC, NL, AB, ON, NL, BC, SK, MB, NB, YT, NT

A bluish-white, lustrous, hard metal, cobalt is permanently magnetic and produced primarily as a by-product of nickel and copper mining. The leading use of cobalt is in the electrodes of rechargeable lithium-ion batteries. It is also used to produce magnetic, wear-resistant, and high-strength alloys, such as those used in gas turbine aircraft engines, and goes into electronic devices and batteries.

64 L7 PrpJrbU ·ΔΛ\6Λ6 64 P\·ΔΛ6 6JaΔ6λ6. L7 Δα<Πλ ძ.<< Ր⊲⊅Ρ∟Ь₺ ЬР.♥ ∪ЬΛ9σ.С ⊲σΓΡ\₺. Ь4 ΔΔ∟ Δ√<<∩г $bD\Gamma DU^b \cdot \Delta d\Lambda D^a$, $b \cdot \Delta^a D \cdot \Delta D^b D \cdot \Delta D^a$ \forall
 CP
 CV
 A
 CV
 A
 CP
 CP
 A
 CP
 A
 CP
 A
 CP
 A
 A
 CP
 A
 64 β₽√ՐԵՍΡΦ LLbCΛdΦ 64 ΦσΓΡΥΦ.



Ⴑϲ·ϧϒͻϧϲ

Copper ⊳5.4∧6 (Cu) BC, MB, ON, QC, NL, ON, QC, NL, SK, MB, NB, YK, NU, NT

A soft, reddish-orange metal, copper is derived

from several minerals, including chalcopyrite and chalcocite. With high ductility, malleability, conductivity, and corrosion resistance, it is a major industrial metal. It goes into electrical wires, plumbing, industrial machinery, and construction materials, as well as clean technologies, such as solar cells, wind turbines, and EVs. Copper surfaces have been found to kill infectious microbes in high-touch areas.

ΦΥΡΥ. ΓΊΦΡΊΔΥ. «ΔΟ ΡΊΝΟΛ» ΔαΔΟΥ VCO» «σΤΟΥσΟ». Cd be-bhp-c by bedh-c. b.D. Γ -dandyc, Δ 0dU- Δ 5 Λ 2 b</>
δ</br>

Δορ·Δσι.
Δσθυλλα DardyrbU·da, b4 V<ba

ΛΙΛΡΥΓόσο ρΑ «ΔρΩθ Δ<Γζόσο», 64 6<46Pa <<

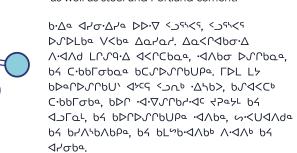
CC6aa, CA6d P2266 60040PL6Pa 6000506UPa, 600ab ρσ·δαγγδαφ 64 σεργφ. Σ5.4Λβ $PVLbd \DeltaQAdPp PQVF\sigma Av$ bσCΔ√ \\Γσbσ∙<Φ.



کر **ک**ہد

Fluorspar <ح<۶ (F) NL

A non-metallic mineral also known as fluorite, fluorspar occurs in numerous colours. It is used in the metallurgical, ceramics, and chemical industries. It is key to producing hydrofluoric acid, a commonly used commercial chemical; to processing uranium and aluminum; and to manufacturing enamels, glass, and fibreglass, as well as steel and Portland cement.





·<65,5C

Gallium ७८५ (Ga) ON, BC, SK, MB, QC,

A soft, silvery metal obtained from bauxite and zinc ores, gallium is used in high-tech applications such as 5G wireless networks, smartphones, laser diodes, semiconductors, solar energy magnetic materials, and military devices. It is also useful in high-temperature thermometers, barometers, pharmaceuticals, and nuclear medicine tests.

ΦΥΡΥ Φ∙ΛΥΒΛΡΥ Λ•ΦΛΙ ΒΡΦΠσι •< ι≤ις υς υς συς συς νουν POST STE STE STEEL BETTER BETT b4 ΔΛσ9·Δ <<p>
ΛΟΕδα. ΔΔL b4 ΔΛσ

ΔΛΕ δΡΡ ΡΥΝΑΡΤ9ΕδΡα $aaaDP9P9\cdot\Delta aa$.



JLabc

Germanium Jsdo⊁L (Ge) BC, NS, NT

A hard, lustrous, grey-white, brittle metalloid, germanium is mostly produced as a by-product of zinc mining, but is also found in the minerals germanite and argyrodite, and in silver, lead, and copper ores. Its most common use is in semiconductors, and it is also used in optical lenses, fibre optics, and solar cells.

 $L^{\circ}b\cdot d\Lambda P$, $\cdot d\Lambda d\Lambda P$ $\cdot d\Lambda^{\circ}b\Lambda P$ $b\circ \Lambda b^{\circ}$ Ισδρίς ωρι ΔΔΓ Φλίρσιδροιδ ωσριδίσρο J5La>C 64 d5P5C>C, 64 ·d∧\6∧P2, ⊃C 64 **ΡΥΙΔΛΕ ΔΙΌΕ. ΔΔΙ ΔΛΟΚΠΗ ΕΡΛΠΕΟΡΦ** LՐ·∇<Δbα•, 64 b▷√Ր6U₽• ▷°₽√dbα•, ρροιδσάλο 64 δώλιρ βρουδορίβρο LLbC∧d₄.



6P<

Graphite 67<70 (C) QC, BC, ON, QC

A soft, crystalline form of carbon, graphite occurs in metamorphic rocks such as schist and gneiss. Major uses include high-temperature lubricants, brushes for electrical motors, brake linings, gaskets, crucibles, electrodes, batteries, and fuel cells.

 $\Delta C = C$ $\Delta C = C$ α⁵⁴. ΔΙΊ</Pbd 6ΡΙΟ >5ΛΡσ6α, ΙΝΔασα bΔνα<C⁶ bΛΓΛυρ⁶, α<Δρ⁶, αν-αυρονα⁶, Δ^ωdU·∇<ΔbαΦ, ΦσΓΡΥΦ 64 Δ∽dU ΦΓΡ5.

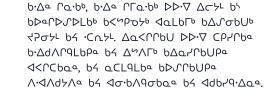


ተ**ይ**ወኑር

A colourless, odourless gas, helium

Helium ムーケー [He] SK

is produced by the natural radioactive decay of elements such as uranium and thorium. It acts as a coolant for superconducting magnets and satellite instruments, and it provides an inert protective atmosphere for making fibre optics and semiconductors, and for arc welding.





Sphalerite くこうと

Indium 🕰 🖺 ראב (In) ON, BC, NS, YT A silvery-white, lustrous metal, indium is

produced mainly as a co-product of the zinc smelting process. Malleable and ductile, with a low melting point, it acts as a superconductor below a certain temperature. It is used in semiconductors, alloys, and solders. It is also used to make indium tin oxide, key to touch screens, flatscreen TVs, and solar panels.

Δ⁶dU·Δ⁵Λ σσ·δΛ9σδσδ ΓΡ6ΛΡUΥΔδ. ΔΔL δ4 ΔΛ⁵<CΦ ԵΡΓΛΥΡΟΥΡΩ Ασ∙ΘΛΑσΘΩΩ, Λ•ΑΛΑΩ ΘΑ Ω b4 ΔΥΥ<CΦ ΒΡΥΓΕΟΝ ΔΦΠΥL Λ·ϤΛΕ ΡΕΥΥ. ΒΥΓσΕΟΝΕ LYQUYPOQAda, LYQUYPOQAda b4 PYYAAAda DarDYPbUAda.



٠>СГσ

The lightest metal, lithium occurs in minerals

such as spodumene and lepidolite and in lithium chloride salts dissolved in brine pools. Its most important use is in rechargeable batteries for cell phones, computers, EVs, and energy storage produced by solar panels and wind turbines. Lithium makes alloys lighter and stronger. Aluminum-lithium alloys are used in aircraft and high-speed trains. In medicine, lithium is used to treat depression and bipolar disorder.

Lithium CAYL (Li) MB, AB, SK, ON, QC

 $\neg \land \supset \subset^{\flat C}$ b4 $\triangle \Delta \bot$ $\subset \bigcap^{\flat \bot}$ $^{\flat \bot}$? $^{\flat C}$ $\mathcal{N} \cdot \triangle Cba^{\circ}$ bC·bb $\Gamma \sigma b U P^{\circ}$ **δΔΛδ<ΛΙασ•Φ. ΡΓα<CΦ δCdσδUΦ δΡ•∇υδΛ9σ•C ΦσΓΡ**ΔΦ $bd<\Gamma \Gamma b L \cdot d\Gamma \Gamma \rho D \cdot \Delta \sigma \Gamma \rho$, $bL \wedge D \Gamma \Gamma \rho$, $\Delta \Lambda$, $bA \wedge \Delta G D \wedge D \Gamma \Gamma \rho D \Gamma \rho$ denotes the periodical properties of the per Δ Ca bd Chom Δ Choa by Δ and Coap. Table by dC_{ρ} subc. $\Delta C_{\rho} = \Delta C_{\rho} + \Delta C_{\rho}$

Magnesium Lゃみとと (Mg)



Dolomite

کرادر

BC, AB, QC

A light silvery-white metal, magnesium is found in the minerals magnesite and dolomite, but much is produced from seawater. One-third less dense than aluminum, it reduces the weight of many products. Alloyed with aluminum, it goes into aircraft and automobile construction. Other uses include electronic devices, power tools, medical applications, and construction.

QQDΛβQ · L⁶σ¹Δ¹C 64 Ͻ₂L¹C, ωσ¹ ΔΔL ΦαΓΦΛΦΙδα ΡΓ6Γ⁶. 6.Δα Ь◁ΛΛσ·ЬΡΦ <ΛΦ 9dΦΦ ΡΡΥΥΡΡΦ. ΓΡΓ ΔΡΦΥΡΥΡΡΠΡ ΔΛάζζο βαζληγρα άζηςβαλάα, Φρράζηςβαα, Γρόδο <<p><Cba b4 ·</p>
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0
√0</



くヶらし、

Manganese Leboy (Mn) NB. NL

A silvery-white metal derived from the minerals pyrolusite and manganite, manganese is the fourth most widely used metal in the world. It is essential to steelmaking, which uses 90% of production, and to lithium-ion batteries for EVs and other renewable energy applications such as electricity grid storage.

<>500 Lapate, DD. Lapat o.d Δισο δαζηγου Γλ.δρι δρ.δ Λ.αλ. βραζο $bD^{a}\Gamma D^{b}\Gamma bU^{b}$ $bL^{\omega}b\cdot d\Lambda b^{b}$ $\Lambda\cdot d\Lambda^{b}$, 9L Λd ΓσΦ 90% 6>Φ >ΛΥ6U, 64 6Cd<</p> dCP bata d

CΛ94 Δ94U βρΦΓ ΛΓΦΡΓΡΡ.

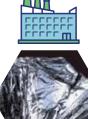


Graphite, Hedenbergite, Ilmenite, Molybdenite, Pentlandite, Pyrolusite, Scheelite, Sphalerite, Spodumene, Stibnite. Maggie Wilson: Cobaltite, Uraninite. R. Lavinsky/www.iRocks.com/Arkenstone: Bastnäsite, Cassiterite, Chalcopyrite, Columbite, Dolomite, Germanite, Pollucite, Tantalite. Minerals Education Coalition: Potash. Fabre Minerals: Vanadinite. WRITER AND EDITOR: Victoria Stratton PROJECT MANAGER: Lesley Hymers DESIGN: TWGCommunications.com

PHOTO CREDITS: Metal/Mineral Photos Courtesy of: R.Weller/Cochise College: Bauxite, Bismuthinite, Chalcocite, Chromite, Dolomite, Fluorite, Garnierite,

δΕναργ-σε δρ-Δρω-σν-σε Λ-σφ/σησο Εναργόδο ο δροκρραμίσε δο: **σε -σω-ε/συν-ν -δεν:** «-δκλε, ΛλΕρανε, δ-εδνε, δες συν-κ, δεσρλε, δεσρ Δሩገ_ዉኑና, ・L፫<UႭϧና, Vͼ୯፫ርϧና, ናናጋጓϧ՜, ምርϧና, ነ<ጋ<mark>구</mark>ϧና, ነ>ር୮σ, ነበናፊϧና, **LP ・Δሩካሬ:** d<ሩርϧና, የንፈϧና, R. Lavinsky/www.iRocks.com/Arkenstone: <ነርፊϧና, bィጋ<mark>ን</mark>ϧና, υሩ-ϧΛ<mark>ን</mark>ϧς · bc L<>ኑ, ጋጋኒኑና, ሀሩኒልኑና, >ኃኒኑና, ርፍርሬኑና, **ፈተማዓ-ፊፍ የРይይኒዓ-ፊፍ <ናማዓ-ፊፍ:** ‹<ርጐ. **V>ና ፈተማዓ-ፊፍ:** <ዉበፊኑና

Mined / Processed / Potential Deposits



Molybdenite

∙L⊂≺UڡϞϲ

BC, ON, NB, YT

A silvery-grey metal derived from the mineral molybdenite, molybdenum is usually extracted as a by-product of copper and tungsten mining. It contributes corrosion resistance, strength, toughness, and hardness to steel alloys used for pipelines, jet engines, wind turbines, pharmaceutical and chemical mills, tanker trucks, and drills.

Molybdenum ·L←<UaL (Mo)

 $\cdot 4 \text{LbU} \cdot 4 \text{Cha} \wedge 4 \text{Cha$ Danabu Dh. αλαβ β4 Calna β1αΔβς. ·ΔΟρ9Lβα $bC \cdot bb\Gamma \sigma bUP^a$, $\Lambda \Gamma U \ b\Delta \mathcal{N} > \ell \Gamma bUP^a \ DC < \sigma \ell^b$, $b4 < d\sigma > \ell ba^a$.



_ხფაქები

Nickel・4ヘッP~のケ・4へb [Ni] BC, MB, ON, QC, NL, AB, ON, QC, NL, YT

A hard, ductile metal, nickel occurs in minerals such as garnierite and pentlandite. It largely ends up in stainless steel, used in numerous applications, from medical equipment to kitchen appliances to aircraft and automobile construction. It is also used as an alloying agent, for electroplating, and in both nickel-cadmium batteries and lithium-ion batteries.

L°6·4Λ6° 64 ΦΥ6ΛΡΥ, ·4Λ°Ρ~σγ·4Λ° ΦαΡΕ6° ΔΔΕ 6°ΦΡ b4 VaccaC>c. ΔΔL L> ΔΛ</bd>
ΔΛ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
Λ
<td **ΦΡΥΓΦΟΡ**^α <5.ΦΔΦα^α ΦΔΥ α<Λ9206α, 64 Φσρην Ρογδας.

Niobium oイハケレ (Nb)



² کا ک

ON, QC, BC, NT

Derived from the minerals columbite and pyrochlore, niobium is a lustrous, grey, ductile metal. Niobium strengthens steel and makes it more corrosion resistant. Alloys containing niobium are used in jet engines and rockets, beams and girders for buildings and oil rigs, and oil and gas pipelines. It is used in superconducting magnets for particle accelerators and MRI scanners.

Λ·ϤΛ^δ b4 b·Δ^α Γ·Ϥ۹ Λ·bΛΡ^ωb^δ. Ϥ<ΓCbα^α bCdσbU^δ σ₹Λ⊁^L ΔΛΟΚΕΦ ΡΓΔΥΚΥΡΦΦΦ ΡΚ ΟΥ ΔΥΛΓΦ ΡΡΟΝΤΡΦ ΤΟΚΥΡΡΦ" ⁶⁴ 64 ΛΓU. ΔΔL 64 ΔΛ</br> PPa·J<Pbae b4 5.57bae.



۷۹۵وروک۵

Pentlandite

Platinum Group Metals (PGMs) bL°b.d\bPe <c∩ar[PGMs] MB, ON, QC, ON, QC, BC, YT, NU

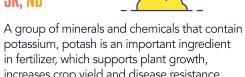
Platinum (Pt), palladium (Pd), rhodium (Rh), ruthenium (Ru), iridium (Ir), and osmium (Os) make up the platinum group metals. PGMs usually occur together in the same mineral deposits, mostly associated with nickel and copper. PGMs are largely used in catalytic

converters for automobile exhaust systems to reduce tailpipe emissions, helping to improve air quality. Most electronic devices, including cell phones and computers, contain circuitry with PGMs.

<CNQL (Pt), <CNYL (Pd), <NYL (Rh), <NGYL (Ru), Δ LNYL (Ir) 64 ΡΊΤΗ (Os) ΓΡΦ 6Ε964Λ6ΡΦ ΛΙΦΛΦΦ. LL° ΡΦΓΕ6ΦΦ $\delta\Delta\mathcal{L}$ be alabe chia idvold notical by Dicane. De $\Gamma\Lambda\Gamma>\cdot \Delta<\Gamma \Gamma$ by $\Gamma\Gamma$ by $\Gamma\Gamma$ bulled $\Gamma\Gamma$ by $\Gamma\Gamma$ bulled $\Gamma\Gamma$ bul



Potash ⋅< C \([K]



Potash ·<C~

increases crop yield and disease resistance, and enhances water preservation. >C 1 , 1 , 1

σς.Δργοσ, γσς.Δργοιο ρλοσ 64 γσ>ι6/200 64



Rare Earth Elements (REEs) ON, BC, QC, NB, NT, YT

Bastnäsite <**५**८०,५४८

A group of 15 lanthanide elements, along with yttrium and scandium, REEs are abundant in the Earth's crust but not in large concentrations. The most abundant source is the mineral bastnäsite, followed by monazite. Usually

high-lustre silver, silvery-white, or grey metals, REEs are used mostly to make permanent magnets. They are key components of cell phones and other electronic devices, and of energy storage and clean energy technologies such as solar cells, high-density batteries, and wind turbines.

Do 15 cacago 9daa. 64 Δσ ·Δος ωρι 64 γραθοί. < 'Cah' b4 Jah'. A AA Λ. Ανανά το για το που b4 L5 Δα<ΓΓ6U 6DeΓ Φ√Γ6UPe PPJ·Δσ5e 64 dCP5e Δ94U·Δ Φ<Λ9ΓλρΩ Φ<ΓCρΦΦ, ρξ ρΩρφηνογιρη ρξ bL⁶b·ΔΔρ·Δς ΔσΓρη b4 ρσ·ρστρρσσ.



Hedenbergite

∆∩σ>¿₽ьс

Scandium YPaUAr (Sc) OC

Often classified with REEs because of similar properties and found in the same ore bodies, scandium is principally used for solid oxide fuel cells and high-performance aluminum-scandium alloys used in the auto and aerospace industries. Other uses include ceramics, electronics, lasers, lighting, and radioactive isotopes.

LY Δια·ο 64 Γρου ΔΔL Λ·ΔΛΔΦ οιρισμορφ, ·ΔΔ ΔΦΦΠΡΕ Δ Q< Γ < Δ b σ < Δ b Γ < Δ Γ b θ b Δ θ < Δ θ dCCba Λ da DCC σ 56 b4 Δ 9C2Cbaa PC \mathcal{D} 9CPbUPa. dCP5a **64 ΔΔL ΔΛ<<C° ΡΡΛΓ6UΡ° ∙** ρρλαΓρρ Γλοδυγ ⊲<υСρσ.

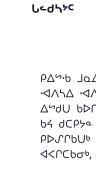


2مرے کو

Tantalum CaCcr [Ia] MB. BC. ON. OC. NT

A rare, blue-grey, very hard metal, tantalum is almost always found with niobium in the minerals columbite and tantalite and is also obtained as a by-product of tin extraction. About half of all tantalum produced is used by the electronics industry, making electricity storage possible in miniature capacitors used in aviation electronics, computers, and other electronic devices.

Λ•ΔΛι CaCcr δρ C•2 Γρ•δρα-δ ραλδις σεγγι ν•δναι dcl<>c b4 CaCc>c b4 DardCAσbU bDardJrbUb Na PORT = PORT =



Chalcocite

Mainly a by-product of copper-bearing mineral processing, tellurium is a silvery-white metalloid. It has applications in solar panels, rubber production, electronics, and more. Ultra-high purity tellurium can be used for semiconductor technologies used in medical imaging, advanced security and military systems, and for next generation solid-state batteries.

Tellurium しょったと (Te) ON, ON,

ΡΔ56 Ισδατί Ρορδηρουίου βρησηριί αλο, «Δα υρπλι •ϤΛϞΔ •ϤΛΖ Λ•ϤΛΦ. ΔΔL ΔΓϤ<ΠΖ ΡΡΓΡΟΟΡΦ •ϤϞΡΦΦΛΦΦ 64 dCPነο 9dao. ΔΛΓ bVbb UJαγι Λ·ΔΛβ CPΔΓα<Co ΡΡΥΓΟυ ΡΡΓΦΡΙΟ 6.Κ. Ιδαα, ΔΔΙ δα. ΥΓ9. Δσο δ4 ΔΠσ9 Δ<ΓCbσ⁰, b4 ·∇Π Δσσbᅆ 9σΔ<Πλ·Δ</p>
ΓL⁰b・ΔΔΡ·Δ
ΔσΓΡ১७.



Tin ∩ • (Sn) QC, NB, NS

A silvery-white metal derived from the mineral cassiterite, tin has multiple uses. It is used for plating, coating, and polishing; solders; flat panel displays; alloys such as bronze and pewter; battery electrodes; dental applications; marine applications; window glass making in electric vehicles, solar energy systems, 5G telecommunications, heat harvesting, hydrogen production and in carbon capture catalysts.

 $\cdot \text{ALA} \cdot \text{AL} \quad \text{ALa Pladby } \Delta \text{BL Alabb by Dest}, \ \text{DD-V}$ Πο V<bo Δα<Γαρα-Δ. ΔΔΕ ΔΛα<ΠΗ ΡΡΛΥΡΟΘ Ρ<Δρο. $P\Gamma$ < 60 Αγουρία Αργού Αργού

Titanium C>UG>L[Ti] QC, QC



حامهر

A hard silvery metal derived from the minerals

ilmenite and rutile, titanium is lightweight, corrosion resistant, and able to withstand extreme temperatures. Most titanium is turned into titanium dioxide, used to improve whiteness in products from toothpaste to paint to food products. Lightweight titanium alloys are widely used in the aerospace industry. As metallic biomaterials, titanium and titanium alloys are used for dental implants, hip replacements, and heart pacemakers.

 $\Gamma_{o}\rho. \triangleleft \vee \rho \sigma \cdot \triangleleft \vee_{o}\rho \vee \rho \sigma \ \vee \cdot \triangleleft \vee_{\rho}$ ΡΡΦΠσ^C ΔΔL ΔεΊα^{5C} b4 SCζε, • 44 C⁵Uσ^{5L} Γ·Ϥ٩σΦΡΖς. ΓC·ϤΦΘΡΒΟ, ΔΦΚΟΦ Γ·ϤΛΥΒΦ $\Delta \nabla \chi d < \text{LLPD} \ b \text{D} \chi \text{LPD} \ \nabla_{\alpha} \text{VLP} \ p \nabla^{\alpha} \text{PP} d = 0$ Δ^{ω} PDPDJPbUPa C Λ^{ω} d $\cdot\Delta\Lambda$ Λ ba, b Λ \cdot $\Delta\Lambda$ d Γ bUb Ρωβαλός Γα ΡΟΔ Ρίζβς.



Scheelite

ᠸᢣᢈ

Tungsten Cab∩a (W) MB, NB, NS, NL, YT, NT

A dense, silvery-white, lustrous metal, tungsten is derived mainly from the minerals wolframite and scheelite. It mostly goes into tungsten carbide, ideal for cutting and wear-resistant applications in construction, metalworking, mining, and oil and gas drilling. It also goes into alloys and specialty steels; aerospace and defence applications; electrical, electronic, heating, lighting, and welding applications; and various chemical applications.

Γ\Π. ΦΛΡΦ ΡΑΙΙ ΙΝΙΚΑΙ ΙΝΙΚΑΙ ΕΝΙΚΑΙ Ε b√αΛ^C ▷<<?Γ^C b4 √ς. Δ√α<ς ₽▷√ρουρο <ασΔραο, $\rho^{\omega}\rho > \Gamma ba \wedge da b4 b \cdot dq \wedge d^{\omega}b \wedge da bd c c \rho a \cdot db dq \cdot d\sigma b$, bΛ·ϤΛd·Ϥι b▷√ՐbUι, Λ·ϤΛdbσι, ΛΓU b4 b\ JQΔ9·Δσι. b4 ΔΛϤ<Cº ΡΡΛΓΡΟΡΘ Λ·ϤΛΗ Ϥ<ΓCΡΘ, ΔΟ</F d<rcbaa, UbA92Pbaa, LLbCAda, PJ2ba, .d\doPba, b4</pre> 44674.0 46000

Uranium マアケト(U) SK, ON, NL



Uraninite

ተРውወንር

One of the densest materials known, occurs in the minerals uraninite uranium and brannerite. It is silvery white, malleable, ductile, and radioactive and is mostly used in the nuclear power industry to generate electricity. It also powers nuclear submarines and goes into nuclear weapons.

 $\mathsf{LP} \cdot \Delta \ \wedge \mathcal{V}^{\rho} \ \forall \forall \mathsf{U} \ \mathsf{Pb} < \mathsf{PVP} \ \mathsf{V} \cdot \forall \mathsf{V}^{\rho} \ \Delta \mathsf{UC} \cdot \mathsf{P}^{\rho}$ ΔΔΕ ΚΡΦρς ΚΡΦρς ρΚ ΚΡΦΡρς. •ΔΛΥΔ •ϤΛΖ, •Ϥ•∇ΦΛΡσου, ΛΥΛ9σου οί Δυσυνο οί Δυσίςο $P\Gamma<^{\circ}b\Lambda$ P7 $b\sigma$ $\Delta^{\circ}dU$ PP Γ D Γ PUbUb. b4 D Φ Γ D Γ PbUΓΦΡΓΡρ διζωργιρα Φσιγρ διιτσο ρη διζωργιρα



Vanadinite

<ՓՈՓ᠈ϲ

Vanadium <っつケレ (V)

ON, QC

A soft, shiny, silvery-white metal, vanadium occurs in crude oil and numerous minerals, including vanadinite and carnotite. Produced mainly as a by-product, its main use is in highstrength steels for construction, auto parts, heavy equipment, industrial tools, medical devices, turbine engines, and military vehicles. Emerging vanadium redox flow battery (VRFB) technology is a promising way to store energy from renewable sources.

Daldy ρες VLD ρε Λερ ναρίσιρο Cq < σ \cap α $^{\flat C}$ \circ ϕ \circ Λ - Λ ^b bdr dupla - Δ b Δ 9- Δ σ b, dc< σ 5b pdupla- Δ c, bdybpa Pataupa adpaktebaa, pradp aktebaa, L⁶ΡΡ·Δ <<CCba≥, <<.Δ√6 b4 ΦΠσ9 DC<.σ√6, ΓDL $\mathsf{b4} \ \, \mathsf{\nabla}\mathsf{D}\mathsf{\Gamma} \ \, \mathsf{D}\mathsf{\mathcal{N}}\mathsf{C}\mathsf{b}\mathsf{d}\mathsf{C} \ \, \mathsf{d}\mathsf{\sigma}\mathsf{\Gamma}\mathsf{P}\mathsf{d}\mathsf{b} \ \, (\mathsf{VRFB}) \ \, \mathsf{CP}\mathsf{D}\mathsf{d}\mathsf{b}\mathsf{d}\mathsf{C}\mathsf{C}\mathsf{D}\mathsf{d}\mathsf{c}\mathsf{d}\mathsf{C}$ Ρυδληνιδσ.Δ.Δς.

MB, ON, QC, SK, NS, NL, NT

electrical, and hardware industries, and into brass, bronze, and

nickel silver. About 30% of worldwide zinc production comes

from secondary or recycled zinc from such sources as scrap



Sphalerite

عور کړ

A blue-grey, metallic element, zinc is found primarily in the mineral sphalerite. Most zinc is used to galvanize metals to prevent rusting. Galvanized steel is used in many industries, including agriculture, solar, automotive, construction, and telecommunication. Zinc goes into alloys for die-castings in the automobile,

Zinc Yeb (Zn) BC, MB, ON, QC, NB, YT, BC,

galvanized steel and batteries. Λ - Λ b . D b ∇ Λ - Λ b $< \Omega$ -D b P d d b d c c d d c c d d

DC<σ9·Δ°, ·<1bΔ9·Δ° b4 PPጋ·Δσ9·Δ°. b4 Δσ PDΓΡοΚ•Φ DC<σ56, Δ^ωdU9·Δα, b4 Λ·ϤΛdba ϤͽΡbΓda b4 ▷५·ϤΛb b4 ·4∧°b∧6. Lp.5 30 >94ac Ly.7bL6 7a6 $bbaUac b\cdot \Delta d < bLPC CV a P P Q d < Cba$ Λ∙ΦΛΦ 64 ΦΓΡΥ.











THE CANADIAN LE PLAN CANADIEN MINERALS AND POUR LES MINÉRAUX ET LES MÉTAUX



