What are the materials employed in the Magnetic levitation trains?

Magnetic levitation trains (MLT) are the last generation of trains designed to travel faster and more easily. Countries that already use that technology are Japan, Germany, China, South Korea, the United Kingdom, Switzerland and Italy.

Those trains have no pilot, because the rail is activated where is necessary, so it allows the train to move ahead. The missing of friction allows a great saving of energy and the possibility of reaching very high speeds (the top speed of a MLT is 603 km/h). The magnets are placed laterally and behind the rail.

They exploit the principle of the superconductivity: the electrical resistance of a metallic conductor decreases gradually as temperature is lowered. Even near absolute zero, a normal conductor still shows some resistance. In a superconductor, the resistance drops to zero when the material is cooled below its critical temperature. So an electric current through a loop of superconducting wire can pass through it with no power source. The superconducting materials employed are:

Niobite (for niobium): Mined in Brasil, Canada, Nigeria, Democratic Republic of Congo and Russia

Titanite (for titanium): Mined in Australia, North America, Malaysia and National Park of Beingua in Italy.

Vanadinite (for vanadium): Extracts from deposits of oil, coal and tar sand. Mined in Canada, Finland, Peru , South Africa, China and Russia

Coal (for tin): Mined in Sierra Leone, Australia, Ruanda, Peru, Bolivia, Brasil, Singapore, Belgium, Latvia, Birmania and USA

Bauxite (for aluminum): Mined in China, Russia, Canada, India, United Arab Emirates, Australia, Norway and USA

Borax (for boron): Mined in USA, Turkey and Argentine

Magnesite (for magnesium): Mined in China, Turkey, Russia, Austria, Slovakia, Spain, Brasil, Australia, Greece and North Korea

Rare Earth Elements (REE) and Uranium (for yttrium): Mined in China, USA, Russia, Niger, Australia, Kazakistan, South Africa, Namibia and Uzbekistan

Barite (for barium): Mined in USA, Brasil, Mexico, India, Germany, England and Iceland

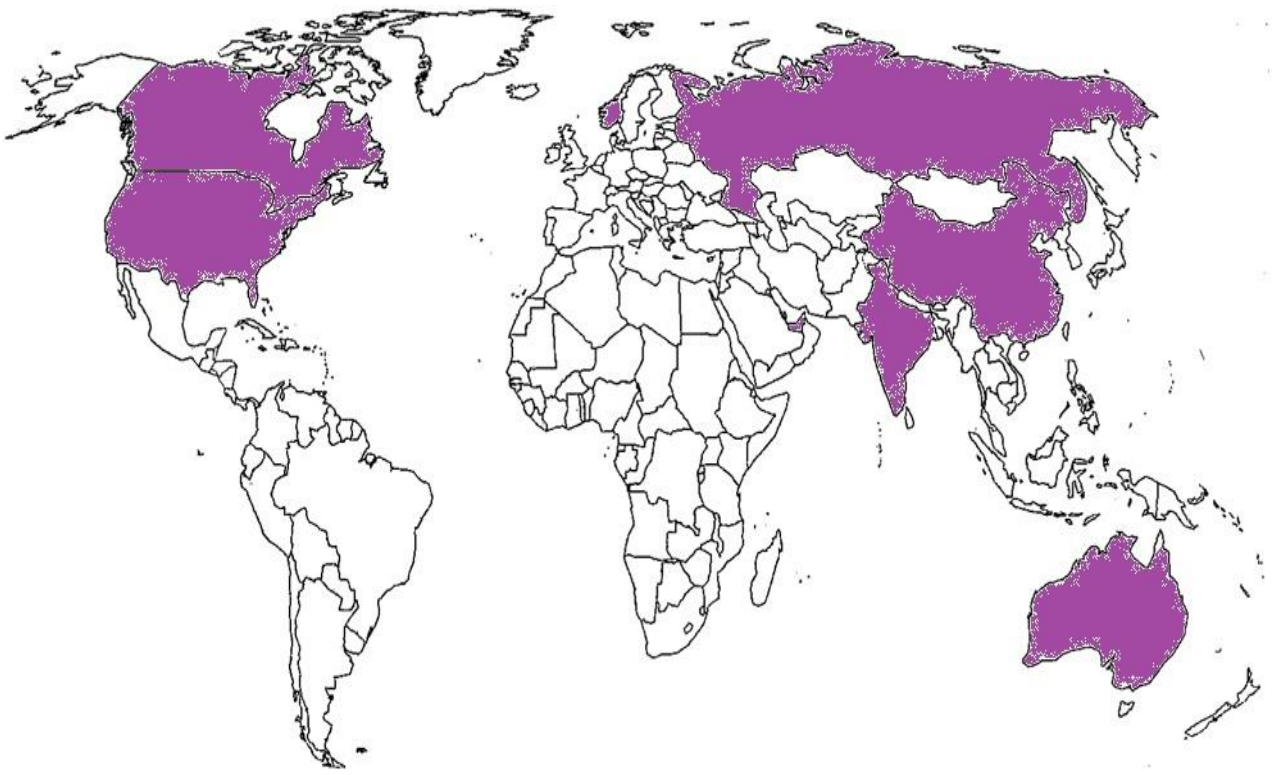
Copper: Mined in Chile, China, Peru, USA, Democratic Republic of Congo, Australia, Russia, Canada, Zambia and Mexico

Barite

Mined in: USA, Brasil, Mexico, India, Germany, England and Iceland

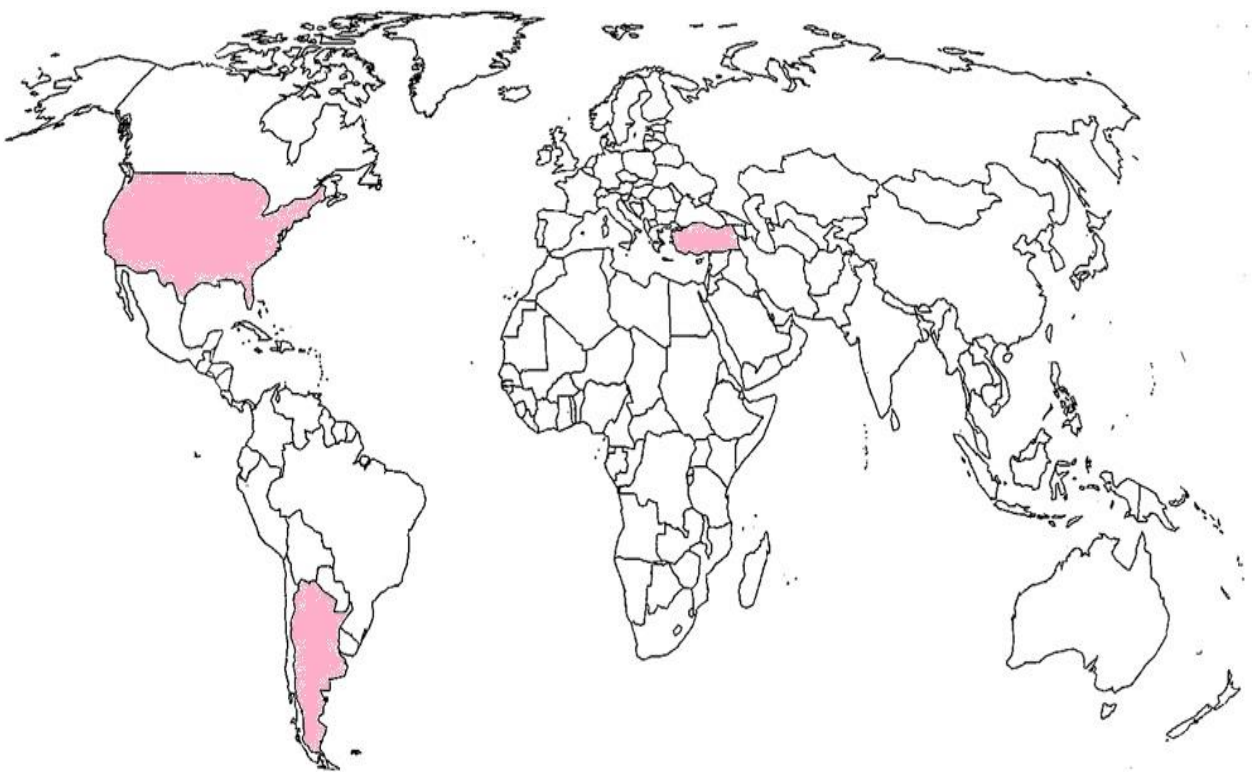
Bauxite

Mined in: China, Russia, Canada, India, United Arab Emirates, Australia, Norway and USA



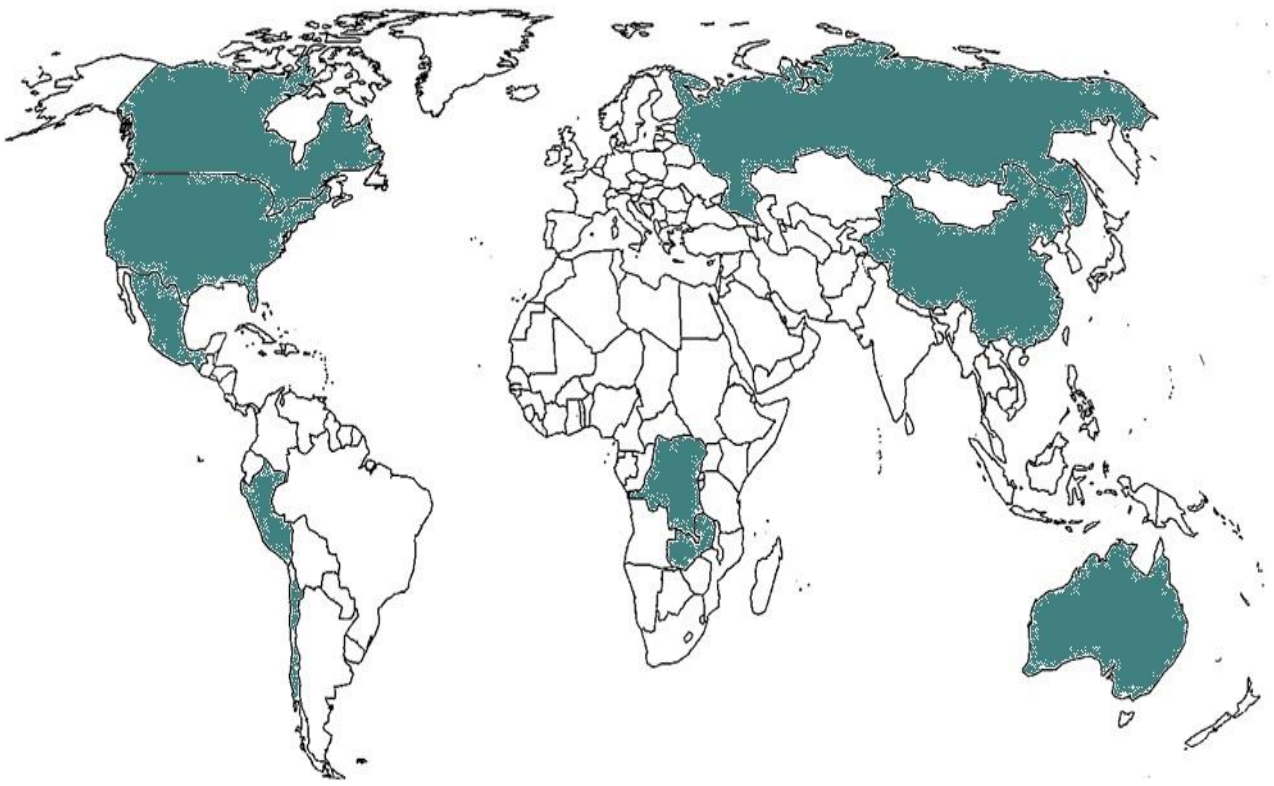
Borax

Mined in: USA, Turkey and Argentine.



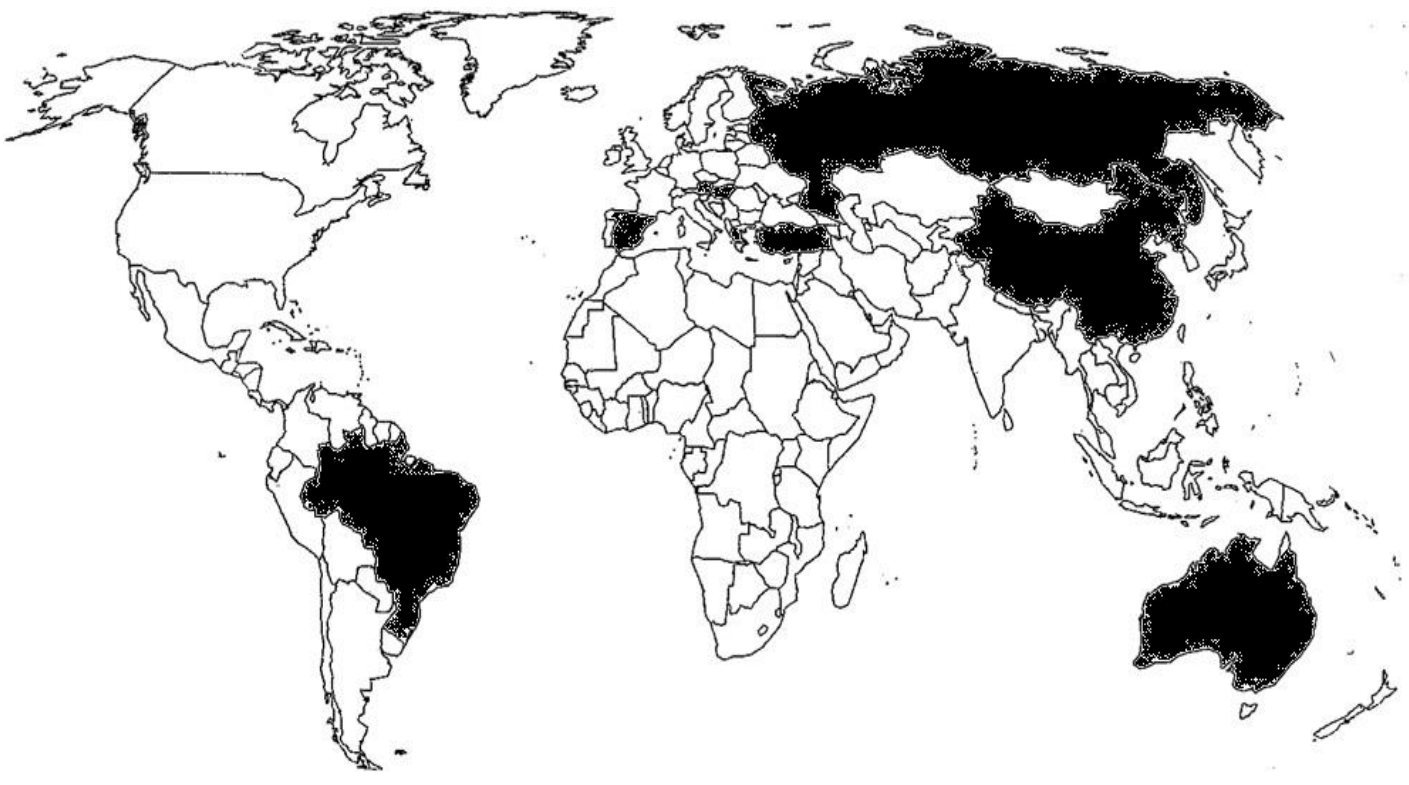
Copper

Mined in Chile, China, Peru, USA, Democratic Republic of Congo, Australia, Russia, Canada, Zambia and Mexico



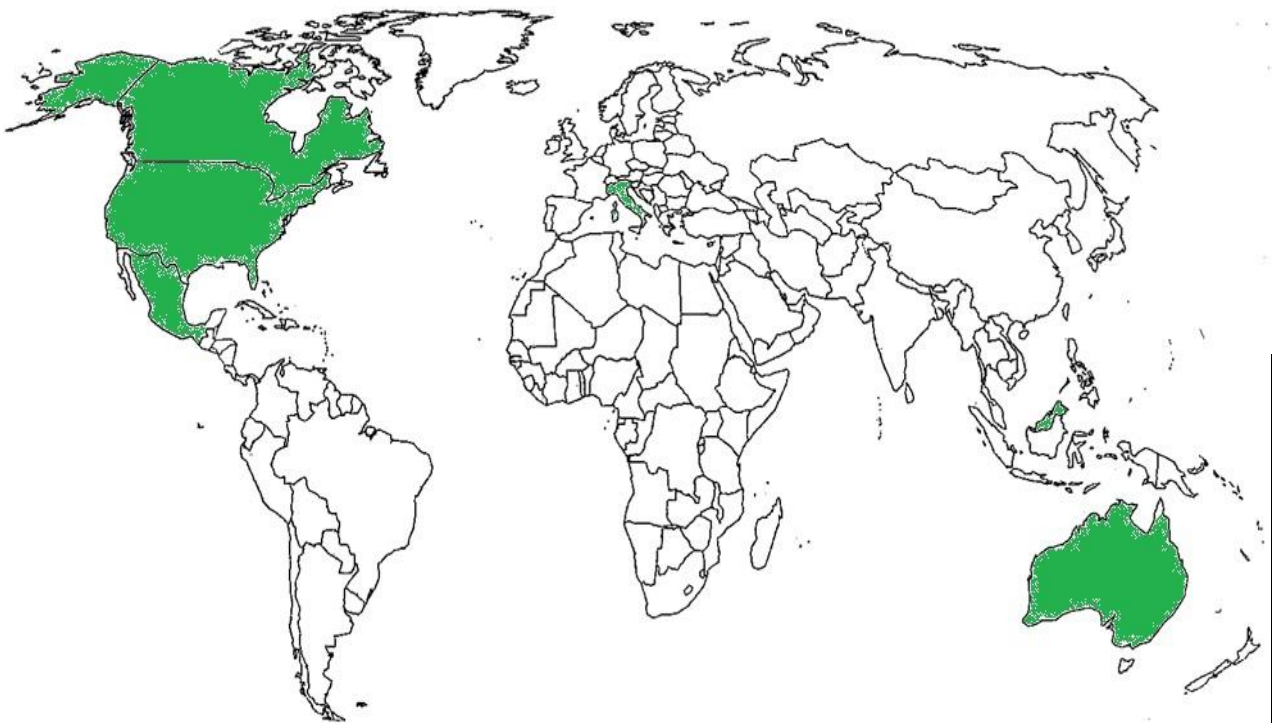
Magnesite

Mined in China, Turkey, Russia, Austria, Slovakia, Spain, Brasil, Australia, Greece and North Korea



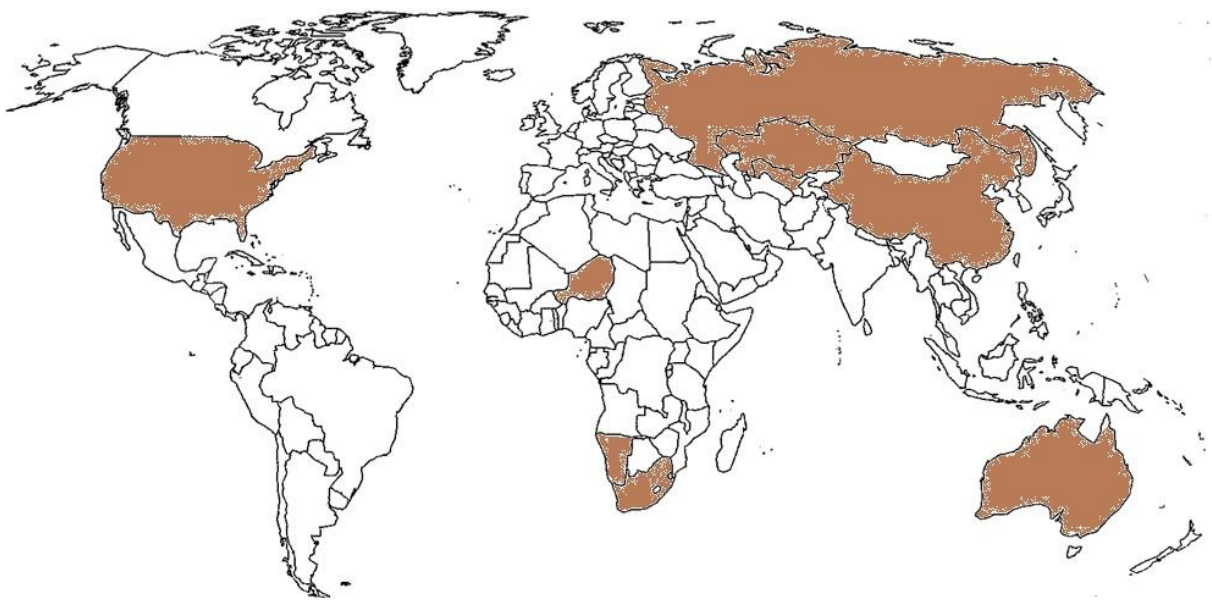
Titanite

Mined in Australia, North America, Malaysia and National Park of Beingua in Italy.



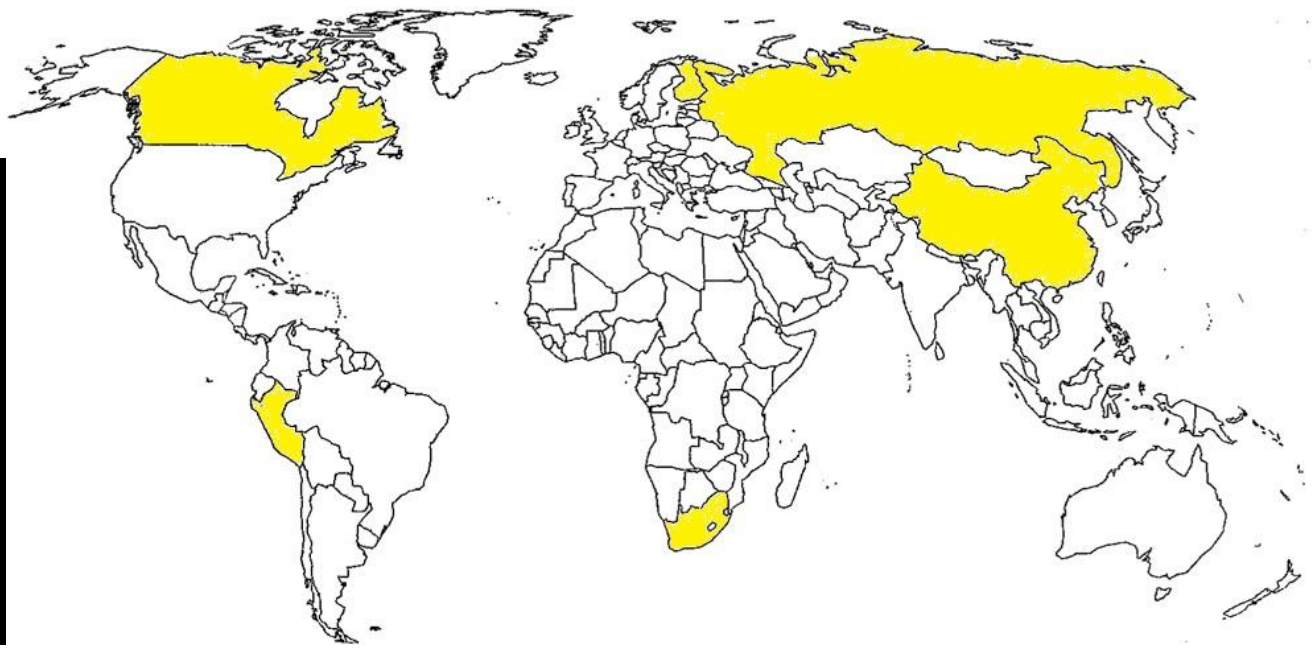
REE and Uranium

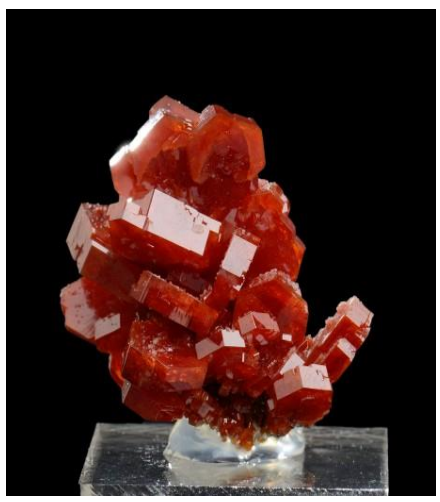
Mined in China, USA, Russia, Niger, Australia, Kazakistan, South Africa, Namibia and Uzbekistan



Vanadinite

Extracts from deposits of oil, coal and tar sand. Mined in Canada, Finland, Peru , South Africa, China and Russia



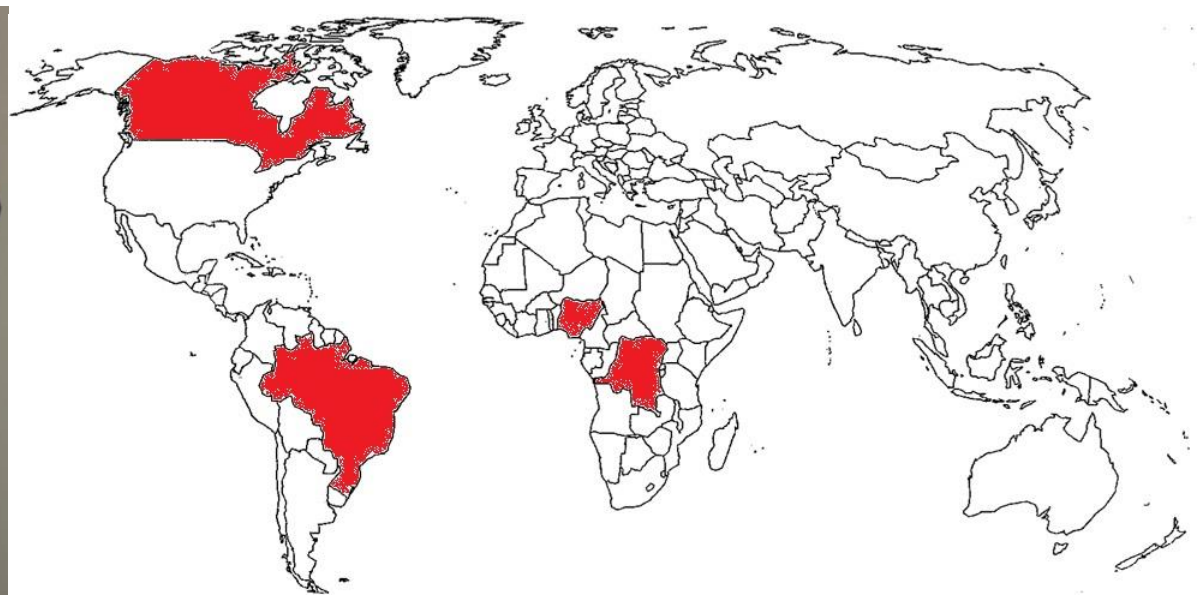


Tin

Mined in Sierra Leone, Australia, Ruanda, Peru, Bolivia, Brasil, Singapore, Belgium, Latvia, Birmania and USA.

Niobite

Mined in Brasil, Canada, Nigeria, Democratic Republic of Congo and Russia.



Almost all those raw materials are critical, except for titanium, vanadium, aluminium, copper (titanium and aluminium are about to become critical). Not-critical superconducting materials, which can replace the others, are lead, alloys like niobium-titanium or iron and carbon nanotubes.

Final thoughts.

MLTs are for sure an incredibly smart way to travel, but we should limit their employment because they’re expensive to build and because of the critical materials used

in them, so we should use MLTs only for big journey and in places where it's strictly necessary.

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