

# PLATINUM IN NEUROMODULATION DEVICES

Platinum's electrical conductivity and biocompatibility make it an ideal material for neuromodulation devices

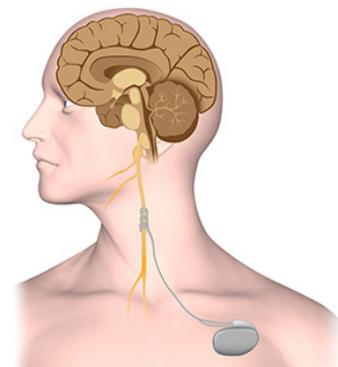
Neuromodulation or neurostimulation is a therapy that acts directly on the nervous system, often using implantable devices that deliver electrical impulses to nerves or within the brain itself. It can also work by allowing targeted doses of pharmaceuticals to be applied directly to the site within the body where they are needed. It is used to treat and alleviate symptoms across a wide range of conditions, for example: epilepsy; stroke; migraine; chronic pain; and movement disorders such as Parkinson's disease.

Neurostimulation devices work by applying electrodes to the brain, the spinal cord or the peripheral nerves, depending on the condition being treated. These then connect to a pulse generator and a power source which generates the necessary electrical stimulation. Certain neuromodulation devices use platinum-iridium electrodes and can also incorporate platinum components in pulse generators.

Platinum's unique characteristics make it especially suited to medical devices like neuromodulators. It is an excellent electrical conductor and, because of its purity, it is also highly biocompatible. This means that platinum is well tolerated by the human body and unlikely to cause an allergic reaction. In addition, platinum is inert and does not corrode inside the body.

Neurostimulation as we know it today began in the 1960s, when deep brain stimulation devices were used to treat pain. Since then, the field of biotechnology has advanced with devices becoming smaller, with improved functionality. The advent of micro-electro-mechanical systems (MEMS) and nanotechnology techniques are also influencing developments in this area.

According to the International Neuromodulation Society, citing a market research report from Neurotech Reports, neuromodulation is poised to be a major growth industry over the next decade. In 2018 the market was estimated to be worth US\$8.4 billion, with the potential to be worth US\$13.3 billion in 2022.



*A neurostimulation device implanted around the left vagus nerve in the neck can be used to treat epilepsy and mood disorders*

## Implications for platinum

In addition to its use in neuromodulation devices, platinum has a broad range of medical applications including catheters, stents, clot-retrieval devices and pacemakers. It is also used in some treatments for cancer. Demand for platinum in medical applications was 240,000 oz in 2018.

As with forecast demand for neuromodulation devices, overall demand for healthcare is expected to rise.

This is due to changing demographics, population growth (to reach more than 8.5 billion globally by 2050 according to the United Nations Environment Programme) and increasing access to advanced medical care in both developed and developing countries. This implies a positive outlook for platinum demand from medical applications.

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