



## RAW MATERIALS FOR DECARBONISATION

# Platinum-group metals and nickel

### What are the six chemical elements referred to as the platinum-group metals (PGM) or platinum-group elements (PGE)?

Platinum (Pt), palladium (Pd), rhodium (Rh), ruthenium (Ru), iridium (Ir) and osmium (Os).

### What is the chief use of platinum, palladium and rhodium?

In autocatalysts, but also used in production of chemicals, pharmaceuticals and glass. They also have important applications in the electronics industry and for dental and medical purposes.

A significant amount of platinum is used in jewellery and for investment in the form of coins, bars, and exchange-traded funds.

### Where are PGM found?

The most important deposits are two principal deposit classes associated with mafic and ultramafic igneous rocks:

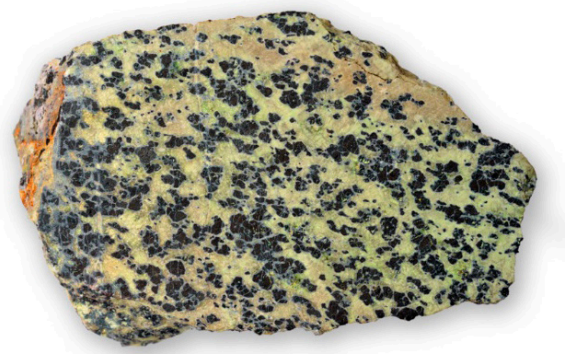
- PGM-dominant deposits (PGM main economic product) — most important deposits found in South Africa.

- Magmatic nickel-copper sulphide deposits (PGM generally a by-product of nickel extraction) — best developed in Russia and Canada.

Several parts of the UK are prospective for PGM but the most interesting areas are in Scotland and Cornwall.

### What form of PGM is the largest share of UK trade?

In terms of volume waste and scrap, but, by value, unwrought and partly-worked forms are more significant with an import value of £2.5 billion in 2017 and an export value of about £4 billion.



**Figure 1** High-grade platinum-bearing chromite ore from the Unst ophiolite in Shetland. P725758.

## What is nickel?

Nickel is a silvery-white, lustrous metallic element, which belongs to the transition metals and is relatively abundant in the Earth's crust.

## How is nickel used?

More than two thirds of global nickel production is used to produce stainless steel. It is also used in other forms of steel and non-ferrous alloys and in plating, catalysts and magnets. Less than 5% of global nickel production is used in lithium-iron batteries.

## Where is nickel found?

Nickel commonly occurs together in nature with PGM and they are extracted from the same ores in many deposits. In 2017 approximately 61% of global nickel production was derived from laterite deposits, the remainder was from magmatic sulphide deposits.

## Does the UK import nickel?

Yes — the UK imports of nickel in all forms was valued at £545 million in 2017.

## Does the UK export nickel?

Yes — the UK exports of nickel in all forms was valued at £523 million in 2017.

## What are the important forms of nickel for UK trade?

Mattes and sinters, scrap, ferro-nickel, unwrought metal and unwrought alloys.

## Where does nickel occur in the UK?

Nickel is found in several parts of the UK but the most interesting occurrences are in north-east Scotland.



**Figure 1** Skutterudite, a Cobalt-Nickel Arsenid. P725507.