# ID Card
# Rhodium

***Version 18 July 2023***

*Notes:*

- *This ID card is used to support the substance sameness discussions in SIEFs and to describe the substance to the best of the SIEF members' knowledge.*
- *It also aims at grouping communications relevant to the request of available data or information, the approval of the proposed Lead Registrant and the registration strategy with the SIEF.*
- *It is the responsibility of each individual registrant to identify their substance and to report company-specific identity in their Registration Dossier (section 1 of IUCLID).*



## 1. Identification of the substance

**Table 1. Identification of the substance**

| | Original (in EC inventory) |
|---|---|
| **Name** | Rhodium |
| **EC number** | 231-125-0 |
| **CAS number** | 7440-16-6 |
| **Description** | Not available |
| **Composition type** | Mono-constituent substance |

## 2. Synonyms and other identifiers of the substance

**Table 2. Synonyms and other identifiers of the substance**

| | |
|---|---|
| **IUPAC name** | Rhodium |
| **CAS name** | |
| **Abbreviations** | |
| **Other commercial, brand or international names** | Rhodium black |
| **Other identity codes** | PubChem ID: 23948 |

## 3. Substances (with core identifiers) also falling under this substance (with justification)

None

## 4. Information related to molecular and structural formula of the substance

**Table 3. Information related to molecular and structural formula of the substance**

| | |
|---|---|
| **Molecular formula** | Rh |
| **Structural formula** | Rh |
| **Smiles notation** | [Rh] |
| **Optical activity** | Not applicable |
| **Typical ratio of (stereo) isomers** | Not applicable |
| **Molecular Weight / Molecular Weight range** | 102,91 g/mol |

## 5. Typical composition of the substance

**Table 4. Typical composition**

| | Name | Symbol / Formula | Min & Max concentrations (%)§ | Typical concentration (%)§§ |
|---|---|---|---|---|
| **Main constituent(s)*** | Rhodium | Rh | 99,8 - 100 | > 99,9$ |
| **Impurity(ies)#** | Several minor (especially metallic) impurities which do not affect the classification of the substance because of their non-hazardous nature or because they do not exceed the classification cut-off limits in the substance | e.g. Ag, Au, Cu, Ir, Pb, Pd, Pt, Ru, Zn | 0 - 0,2 | < 0,1 |

* ≥ 80 % (w/w) for mono-constituent substances; ≥ 10 % (w/w) and < 80 % (w/w) for multi-constituent substances.

# An impurity is an unintended constituent present in a substance, as produced. It may originate from the starting materials or be the result of secondary or incomplete reactions during the production process. While impurities are present in the final substance, they were not intentionally added.

§ Concentration ranges define the substance sameness criteria agreed by all EPMF Members in preparation of the communication with other SIEF members.

§§ Typical concentration refers to the representative sample used for testing.

$ Pure Rhodium conform ASTM B616-96 has a purity of minimum 99,8 %.

The composition given above is typical and should therefore represent the majority of Rhodium as manufactured and/or imported in the EEA market. Rhodium containing less than 99,8 % Rhodium may still be considered to be the same for the purpose of registration under REACH and may be referred to as impure Rhodium to distinguish if from the typically pure Rhodium.

## 6. Information on appearance, physical state and properties of the substance

**Table 5. Appearance / physical state / properties of the solid substance**

| | |
|---|---|
| **Physical state** | Solid |
| **Physical form*** | Crystalline |
| **Appearance** | Grey, silver-white solid |
| **Particle size**** | Fine powder / Coarse powder / Massive object |
| **Does the solid hydrolyse?#** | No |
| **Is the solid hygroscopic?§** | No |

* Crystalline form: solid material whose constituent atoms, molecules, or ions are arranged in an ordered pattern extending in all three spatial dimensions. Amorphous form: solid material whose constituent atoms, molecules, or ions are randomly arranged.

** Nanoform: particles in the size range 1 - 100 nm (for full definition of a nanomaterial, see http://ec.europa.eu/environment/chemicals/nanotech/index.htm#definition). Fine powder: particles in the size range 100 – 2.500 nm. Coarse powder: particles in the size range 2.500 nm – 1 mm. Massive object: particles in the size range > 1 mm.

# Hydrolysis: decomposition (cleavage of chemical bonds) by the addition of water.

§ Hygroscopic substance: readily attracts moisture from its surroundings in open air, through either absorption or adsorption. Cf. also water/moisture content in Table 4.

## 7. Analytical data

Annex VI of REACH requires the registrant to describe the analytical methods and/or to provide the bibliographical references for the methods used for identification of the substance and, where appropriate, for the identification of impurities and additives. This information should be sufficient to allow the methods to be reproduced.

**Table 6. Analytical methods for identification of the substance**

| Parameter / Method | Recommended for substance identification and sameness check | Applicable | Not applicable or not recommended |
|---|---|---|---|
| **Elemental analysis** | | | |
| ICP (ICP-MS or ICP-OES) | X | | |
| Atomic absorption spectroscopy (AAS) | | | |
| Glow discharge mass spectrometry (GDMS) | | | |
| **Molecular analysis** | | | |
| Infrared (IR) spectroscopy | | | X |
| Raman spectroscopy | | | X |
| **Mineralogical analysis** | | | |
| X-Ray Fluorescence (XRF) | | X | |
| X-Ray Diffraction (XRD) | X | | |
| **Morphology and particle sizing** | | | |

| | | | |
|---|---|---|---|
| Electron microscopy (SEM, TEM, REM)* # | | | |
| Laser diffraction* # | X | | |
| Particle size by other means (e.g. sieve analysis)# | | | |
| Surface area by N-BET* # | X | | |
| **Other** | | | |
| | | | |

* Analytical techniques particularly (but not exclusively) relevant for nanomaterials.

# The choice of the technique for particle size depends on the size of the material as manufactured/imported/placed on the market/used.

## 8. Lead Registrant

Johnson Matthey (United Kingdom) volunteers to be the Lead Registrant for Rhodium. The EPMF will provide support to the Lead Registrant as laid down in the EPMF Agreement.

## 9. Scope of the Registration Dossier

The uses included in this Registration Dossier are listed on the EPMF website.

## 10. Analytical reference information

Below the results of XRD analysis of a reference sample used for testing.

| | |
|---|---|
| **Diffractometer:** | Bruker AXS D8 fitted with the option of 90 position sample changer (reflection mode) or capillary stage (transmission mode). |
| **Radiation:** | Cu $K\alpha$ ($\lambda$ = 1.5406 + 1.54439 Å) |
| **Primary Optics:** | Göbel Mirror |
| **Scan Range:** | 10 to 130 ° 2$\theta$, 0.022 ° step size |
| **Scan Mode:** | $\theta/\theta$ coupled |
| **Tube voltage, Current:** | 40 kV, 40 mA |
| **Detector:** | Lynxeye PSD |
| **Temperature:** | **Ambient** |
| **Phase ID:** | **Software:** Bruker AXS Diffrac Plus, Eva V18 (1996-2012), Bruker AXS Diffrac Eva V2.1 (2010-2012)<br>**Databases:** PDF-4+, Release 2015, COD (REV30738 2011.11.2) |
| **Calculation of Lattice Parameters and Crystallite Sizes:** | **Software:** Bruker-AXS Topas 4.2 (1999-2009)<br>**Rietveld analysis:** powder diffraction pattern fitting using full structural models including atomic positions. Crystallite sizes calculated using LVol-IB method.<br>**Pawley analysis:** powder diffraction pattern fitting using unit cell only models. Reflection intensities assigned as required.<br>**Calculated errors:** (reported in brackets) for crystallite size (nm) and lattice parameter data (Å) are attached to the last significant figure. For example, 3.9189(3) Å is 3.9189±0.0003 Å and 29(3) nm is 29±3 nm. |
| **Sample preparation:** | Powdered samples, typically <50µm particle size were packed in flat plate sample holders or borosilicate glass capillaries depending on the mode of measurement.<br>The hazards associated with the sample(s) reported were checked prior to data collection. |

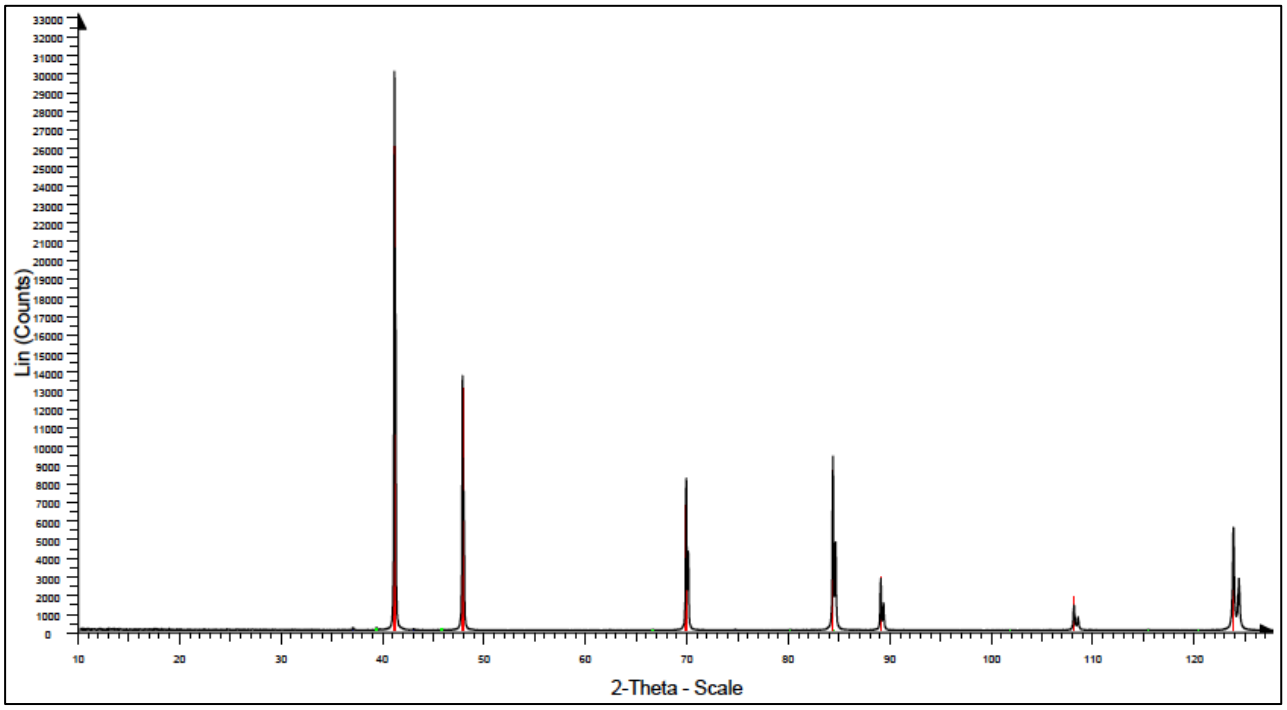


**Figure 1. XRD spectrum of Rhodium**