



ID Card

Rhodium trinitrate

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).

DISCLAIMER

All data and information contained in this document shall be treated by the receiving party (i) in full confidence with the adequate respect of any confidential and/or proprietary nature of such information and (ii) only in the framework of the purpose of agreeing on substance sameness, Lead Registrant and overall REACH Strategy for the concerned Substance under REACH (the 'Purpose').

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1. Identification of the substance

Table 1. Identification of the substance

	Proposed by EPMF	Original (in EC inventory)
Name	Rhodium trinitrate	Rhodium trinitrate
EC number	233-397-6	233-397-6
CAS number	10139-58-9	10139-58-9
Description	<p><i>Rhodium trinitrate is produced from rhodium trihydroxide which is precipitated by addition of sodium hydroxide to rhodium chloride solution. The precipitate is then washed and re-dissolved by addition of nitric acid to form rhodium nitrate solution. The solution is then adjusted to the appropriate concentration or evaporated to dryness to form solid Rhodium nitrate hydrate.</i></p> <p><i>The resulting product will contain bridged polymeric Rh (III) species, nitrate ligands and nitrate-aqua Rh (III) complexes. Due to the variable ratios of undefined polymeric Rh (III) species and rhodium (III) mixed aqua nitrate complexes, the proportions and nature of which will vary depending on the production and storage conditions, this substance has been declared as a UVCB.¹</i></p>	Not available

¹ See also paper 'The chemistry of palladium, platinum and rhodium 'nitrates'' by D. Boyd, 10 September 2013

Composition type	UVCB	
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2. Synonyms and other identifiers of the substance

Table 2. Synonyms and other identifiers of the substance

IUPAC name	Rhodium (3+) trinitrate
CAS name	Nitric acid, rhodium(3+) salt (3:1)
Abbreviations	None
Other commercial, brand or international names	Rhodium nitrate Rhodium(III) nitrate Nitric acid, rhodium(3+) salt
Other identity codes	None

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

Table 3. Substances also falling under this substance

Name	EC number	CAS number	Justification
Rhodium(III) nitrate hydrate		13465-43-5	According to Annex V(6) of the REACH Regulation, hydrates of a substance are exempted from Registration provided that the anhydrous form has been registered by the manufacturer or importer using this exemption.

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

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

Name	Rhodium (3+) trinitrate
Molecular formula	N ₃ O ₉ Rh (anhydrous basis)
Structural formula	
Smiles notation	[N+](=O)([O-])[O-].[N+](=O)([O-])[O-].[N+](=O)([O-])[O-].[Rh+3]
Optical activity	Not available
Typical ratio of (stereo) isomers	Not available
Molecular Weight / Molecular Weight range	288,92 g /mol (anhydrous basis)

5. Usual composition of the substance

The composition given below represents the usual composition available to the Members of the EPMF by the date given above on the document. This usual content represents the majority of the Rhodium trinitrate that is placed on the EEA market.

In a UVCB substance, the number of constituents is relatively large and/or; the composition is, to a significant part, unknown and/or; the variability of composition is relatively large or poorly predictable. Hence, concentration ranges outside the ones given below do not exclude sameness and are usually referred to as unusual or exceptional situations. Each potential registrant is responsible for performing its own analysis.

Table 5. Usual constituents

Name	Symbol / Formula	Min & Max concentrations (%)	Typical concentration (%)
Rhodium trinitrate (including aqua nitrate complexes)	$N_3O_9Rh \cdot xH_2O$	95 – 100 [#]	≥ 99
Chloric acid	HCl	0-1	<1
Nitric acid	HNO ₃	0-1	<1
Water (residual damp)	H ₂ O	0-2	<2
Several minor (especially metallic) constituents 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, Pd, Pt, Ru	0 – 1	≤ 1

[#] Corresponds to 34-36 % Rh.

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

Table 6. Appearance / physical state / properties of the solid substance

Physical state	Solid
Physical form*	Crystalline
Appearance	Brown crystals, damp powder
Particle size**	Fine to coarse powder
Does the solid hydrolyse?#	No
Is the solid hygroscopic?§	Yes

* 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 water from its surroundings, through either absorption or adsorption.

Table 7. Appearance / physical state / properties of the substance in solution

Physical state	Solution
Solvent	Water / HNO ₃ / HNO ₂
Concentration range of substance in solution	20 - 40%
pH (range) of the solution	< 2
Excess acid	0 - 10% HNO ₃ 0 - 10% HNO ₂

Note: The PGM Sameness Expert Group concluded on sameness between solids and solutions of Rhodium trinitrate at its meeting of 20 August 2013.

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 8. 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 (solution)		
Mineralogical analysis			
X-Ray Fluorescence (XRF)			X
X-Ray Diffraction (XRD)	X		
Morphology and particle sizing (solid)			
Electron microscopy (SEM, TEM, REM)* #			X
Laser diffraction* #	X		
Particle size by other means (e.g. sieve analysis)#			X

Surface area by N-BET*#	X		X
Other			
Gravimetry for Rh content		X	
Total nitrate content as nitric acid		X (solid)	

* 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 trinitrate. 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 IR (solid) and Raman (solution) analysis of a reference sample used for testing.

IR analysis (solid)

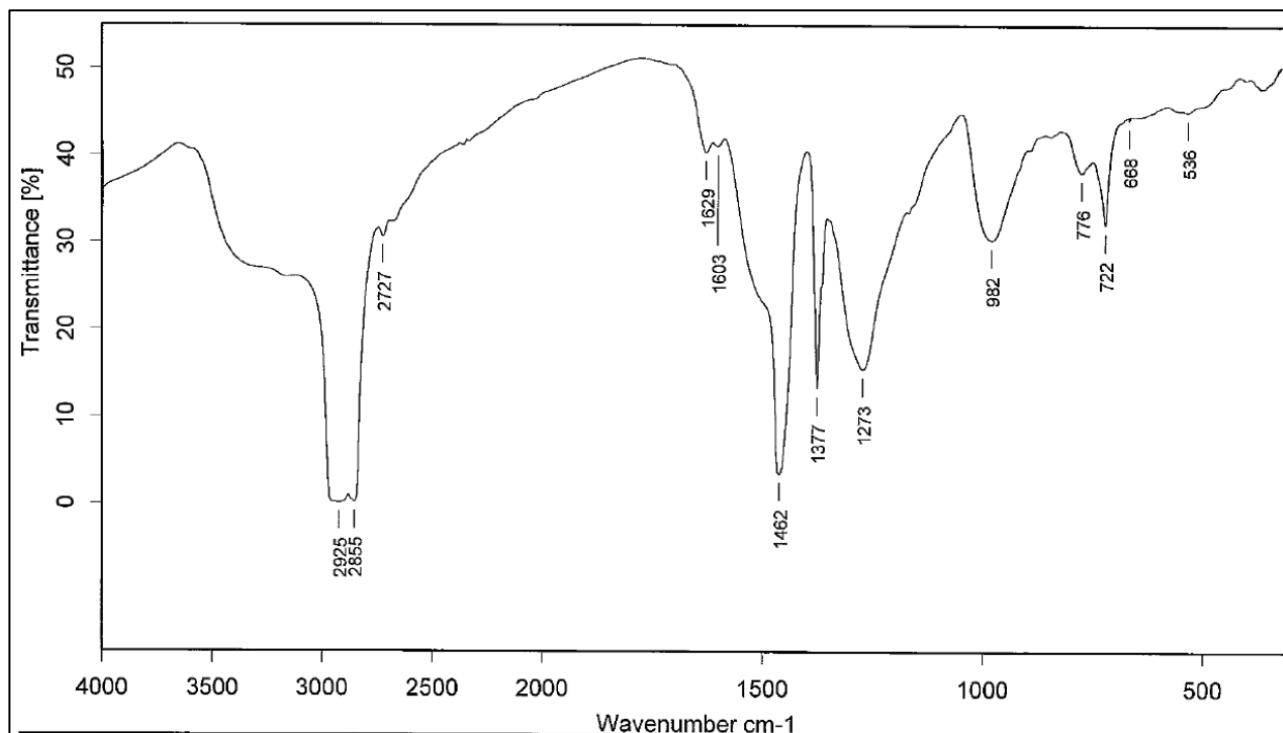


Figure 1. IR spectrum of Rhodium trinitrate solid

Raman analysis (solution)

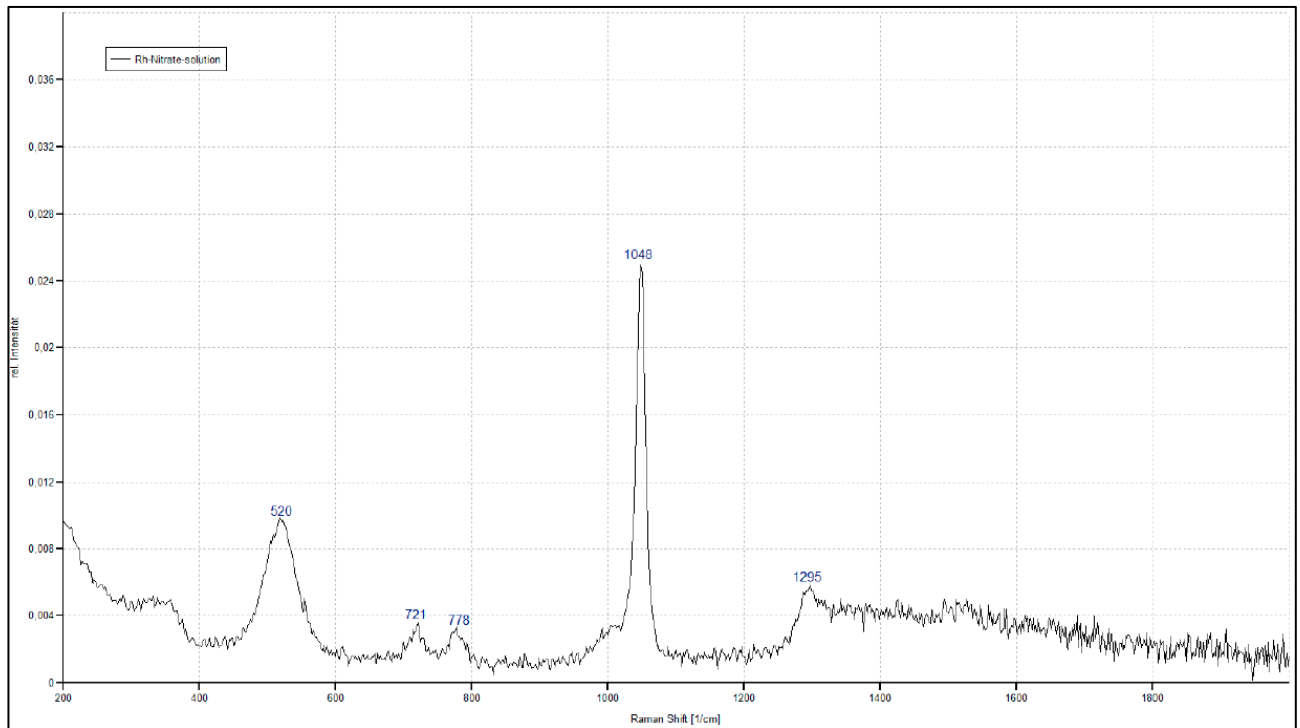


Figure 2. Raman spectrum of Rhodium trinitrate solution