



ID Card

Palladium sulphate

Version 18 July 2023

Notes:

- This ID card is used to support the substance sameness discussions and to describe the substance to the best of the 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.
- 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

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1. Identification of the substance

Table 1. Identification of the substance

	Original (in EC inventory)
Name	Palladium sulphate
EC number	236-957-8
CAS number	13566-03-5
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	Palladium(2+) sulfate
CAS name	
Abbreviations	
Other commercial, brand or international names	Sulfuric acid, palladium salt Palladium monosulfate Palladous sulfate
Other identity codes	

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
Palladium(2+) sulfate hydrate (1:1:2)		13444-98-9	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

Molecular formula	O4PdS (anhydrous basis)
Structural formula	$\begin{array}{c} \text{O} \\ \parallel \\ \text{O}=\text{S}-\text{O}^- \\ \\ \text{O}^-\text{Pd}^{2+} \end{array}$
Smiles notation	[Pd+2].[O-]S([O-])(=O)=O
Optical activity	
Typical ratio of (stereo) isomers	
Molecular Weight / Molecular Weight range	202,48 g/mol (anhydrous basis)

5. Typical composition of the substance

Palladium sulphate exists in anhydrous and hydrated form. All forms of Palladium sulphate will be addressed in the same Registration Dossier but are reported individually in IUCLID section 1.2.

- Palladium sulphate (anhydrous)

Table 5. Typical composition

	Name	Symbol / Formula	Min & Max concentrations (%) ^s	Typical concentration (%) ^{ss}
Main constituent(s)*	Palladium sulphate	O4PdS	99 - 100	> 99
Impurities[#]	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, Pt, Rh, Ru	0 - 1	< 1

* $\geq 80\%$ (w/w) for mono-constituent substances; $\geq 10\%$ (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 Consortium Members in preparation of the communication with other SIEF members.

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

The composition given above is the theoretical composition of Palladium sulphate (anhydrous). The anhydrous form is neither manufactured nor imported in the EEA market, only the hydrated form is.

- Palladium sulphate hydrate

Table 6. Typical composition

	Name	Symbol / Formula	Min & Max concentrations (%) [§]	Typical concentration (%) ^{§§}
Main constituent(s)*	Palladium sulphate hydrate	O4PdS.2H2O	99,4 - 100 [§]	99,8
Impurities#	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, Pt, Rh, Ru	0 – 0,6	0,2

* $\geq 80\%$ (w/w) for mono-constituent substances; $\geq 10\%$ (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 Consortium Members in preparation of the communication with other SIEF members.

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

§ Corresponds to 44,35 – 44,65 % Pd.

The composition given above is typical and should therefore represent the majority of Palladium sulphate hydrate as manufactured and/or imported in the EEA market.

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

Table 7. Appearance / physical state / properties of the solid substance

Physical state	Solid
Physical form*	Crystalline
Appearance	Green-brown crystals
Particle size**	Fine to coarse powder
Does the solid hydrolyse?#	Yes
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 moisture from its surroundings in open air, through either absorption or adsorption. Cf. also water/moisture content in **Error! Reference source not found.**

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			
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

Heraeus Deutschland GmbH & Co. KG (Germany) is the Lead Registrant for Palladium sulphate. 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 Raman analysis of a reference sample in solution.

Spectrometer: Bruker RFS 100/S

Laser: NdYAG 1064 nm

Spectral range: 3500 – 50 cm⁻¹

Resolution: 2 cm⁻¹

Scans: 300 scans

Temperature: ambient

Sample preparation: liquid phase (water), glass vial, closed

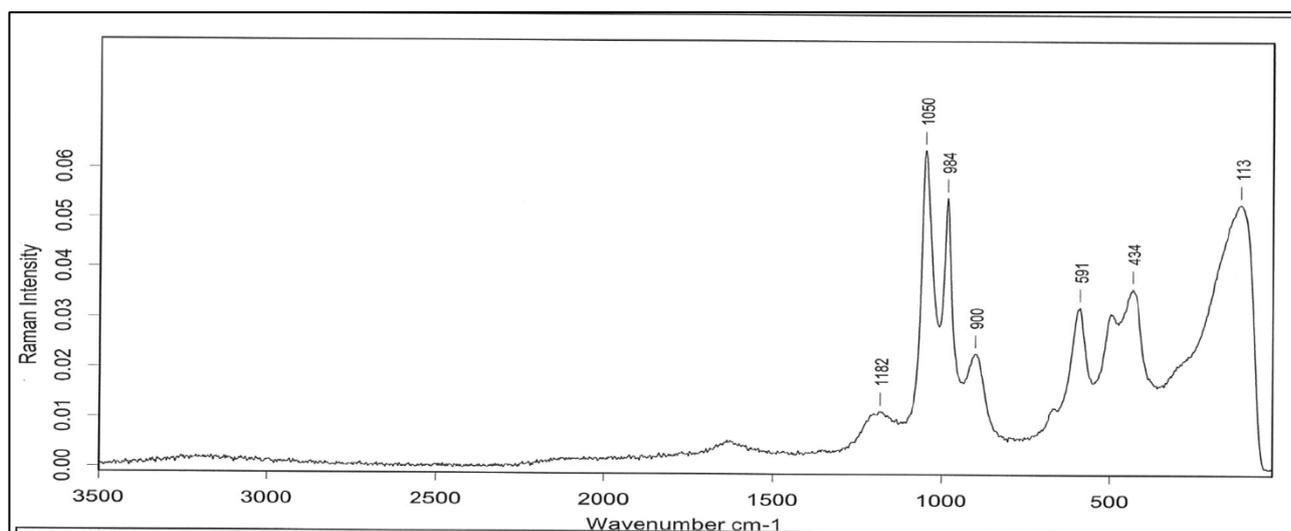


Figure 1. Raman spectrum of Palladium sulphate (solution)