ID Card
Platinum dioxide

Version 17 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	Platinum dioxide
EC number	215-223-0
CAS number	1314-15-4
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	Dioxoplatinum
CAS name	Platinum oxide (PtO2)
Abbreviations	
Other commercial, brand or international names	Adam's catalyst Platinic oxide Platinum(IV) oxide Platinum(IV) oxide hydrate
Other identity codes	

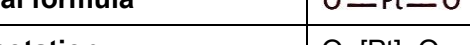
3. Substances (with core identifiers) also falling under this substance (with justification)

Table 3. Substances also falling under this substance

Name	EC number	CAS number	Justification
Platinum(IV) oxide hydrate		52785-06-5	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

Molecular formula	PtO2 (anhydrous basis)
Structural formula	
Smiles notation	O=[Pt]=O
Optical activity	Not applicable
Typical ratio of (stereo) isomers	Not applicable
Molecular Weight / Molecular Weight range	227,08 g/mol (anhydrous basis)

5. Typical composition of the substance

Platinum dioxide can be placed on the market in anhydrous and hydrated form. All forms of Platinum dioxide will be addressed in the same Registration Dossier but are reported individually in IUCLID section 1.2.

- Platinum dioxide (anhydrous)

Table 5. Typical composition

	Name	Symbol / Formula	Min & Max concentrations (%)§	Typical concentration (%)§§
Main constituent(s) *	Platinum dioxide	PtO2	93 – 100	> 94
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	e.g. Ag, Au, Cu, Ir, Pb, Pd, Ru	0 – 0.1	< 0.05

	the classification cut-off limits in the substance			
	Alkali salts	K, Na	0 – 3	< 2
	Water	H_2O	0 – 6	< 4

* ≥ 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.

The composition given above is typical and should therefore represent the majority of Platinum dioxide (anhydrous) as manufactured and/or imported in the EEA market.

- Platinum dioxide hydrate

Table 6. Typical composition

	Name	Symbol / Formula	Min & Max concentrations (%)§	Typical concentration (%)§§
Main constituent(s)*	Platinum dioxide hydrate	PtO2.nH2O	97 - 100	± 99
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, Ru	0 – 0,1	< 0,05
	Alkali salts	K, Na	0 - 3	< 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.

The composition given above is typical and should therefore represent the majority of Platinum dioxide 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	black hexagonal crystals
Particle size**	Fine to coarse powder

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 5.

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

Umicore AG&Co.KG is the Lead Registrant for Platinum dioxide. 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 analysis of platinum dioxide anhydrate.

Spectrometer: Infrared spectrometer Tensor 27; BRUKER Optics

Spectral range: 4000 - 200 cm-1

Resolution: 2 cm-1

Scans: 32 scans

Temperature: ambient

Sample preparation: KBr – disk; 1.62 mg Sample / 329.30 mg KBr

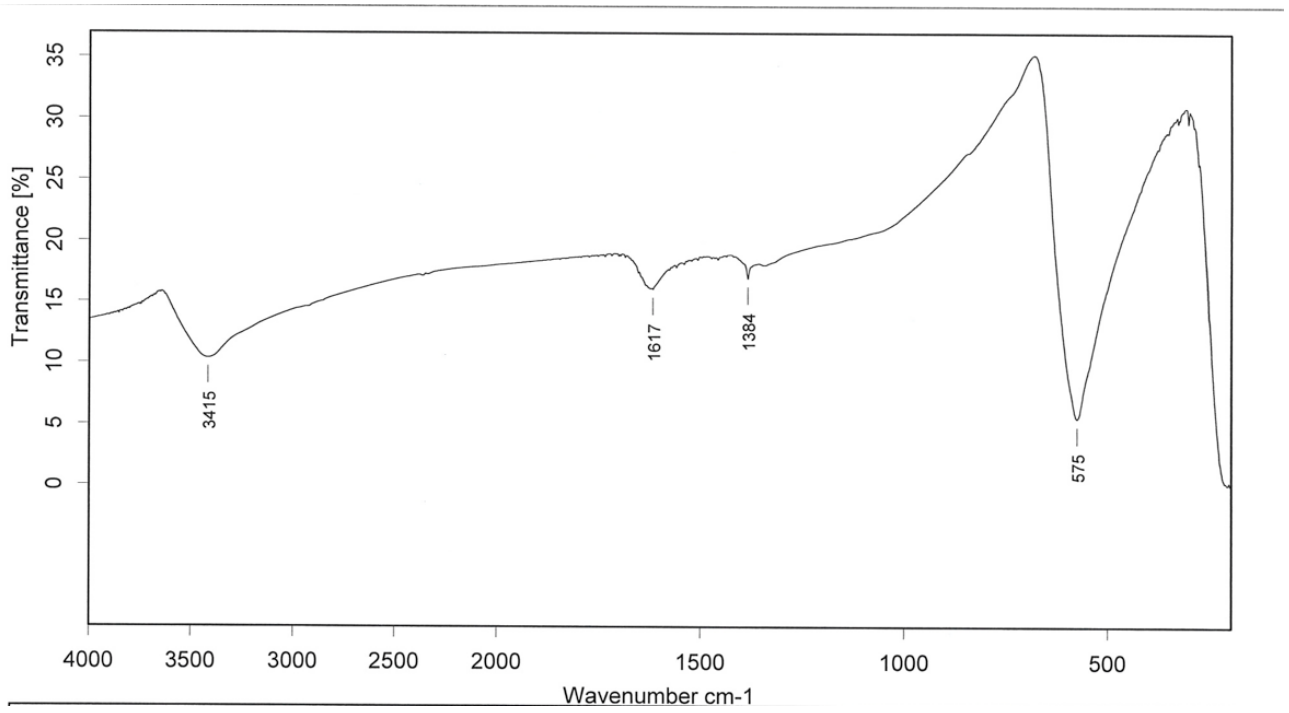


Figure 1. IR spectrum of Platinum dioxide anhydrate

Below the results of IR analysis of a reference sample used for testing (Platinum dioxide hydrate).

Spectrometer: Infrared spectrometer Tensor 27, BRUKER Optics

Spectral range: 4000 - 300 cm-1

Resolution: 2 cm-1

Scans: 32 scans

Temperature: ambient

Sample preparation: Nujol mull, undefined layer CsJ

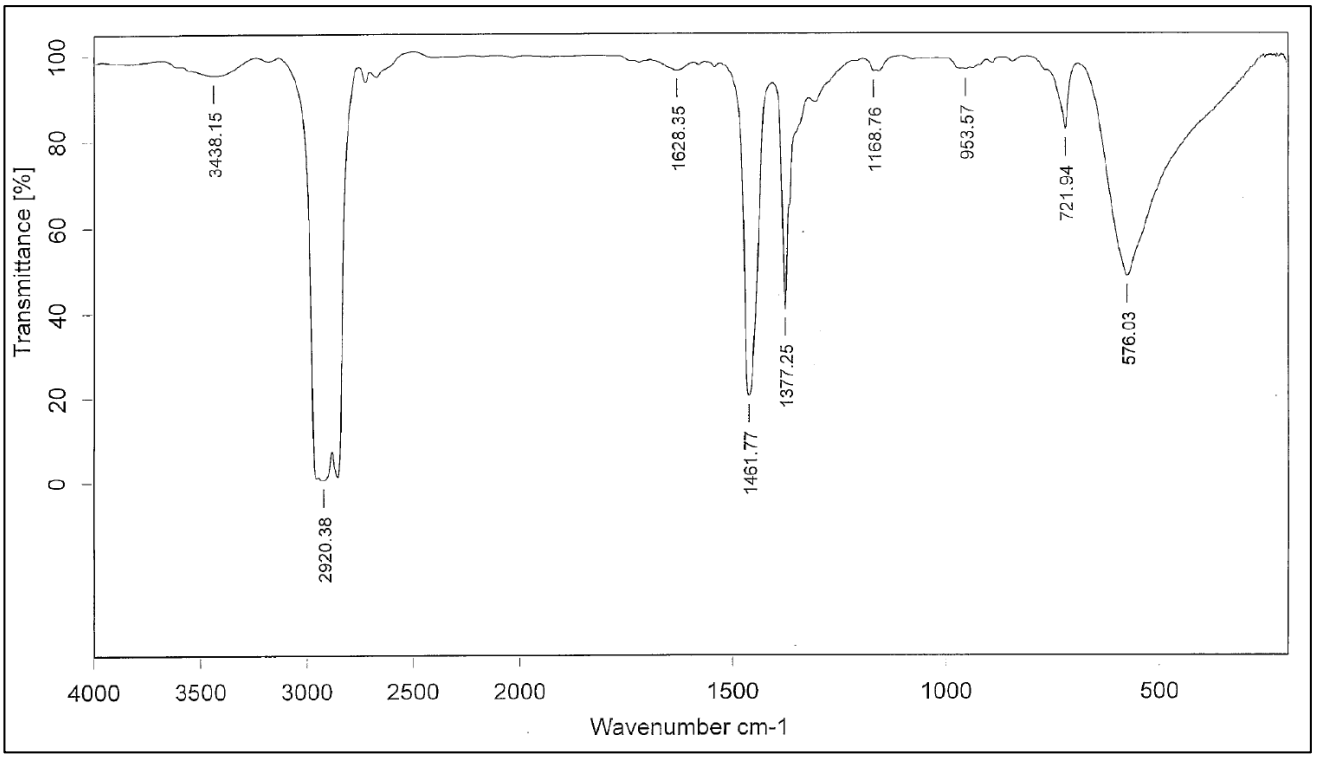


Figure 2. IR spectrum of Platinum dioxide hydrate