EUROPEAN COMMISSION
JOINT RESEARCH CENTRE

JRC NANOMATERIALS REPOSITORY

List of Representative Nanomaterials

(June 2016)

The table below provides a list of the nanomaterials (NMs) hosted in the JRC Nanomaterials Repository and their main physico-chemical characteristics. Measurements to determine the primary particle size, the particle size distribution, the average length (CNT) and diameter were performed by TEM (unless specified otherwise); the specific surface area was determined via gas sorption analysis (BET method). More information on the physico-chemical characterisation of the representative nanomaterials can be found in material-specific JRC reports (referenced at the end of the table).

JRC ID[1]	Former NM code	Type of material[2]	Primary particle size [nm]	Particle size distribution [nm]	Specific surface area [m^2/g]	Average Length[3] for CNTs [nm]	Average Diameter[3] for CNTs [nm]	Other information
JRCNM10200a		Titanium Dioxide	115	N/A	N/A			Anatase
JRCNM10202a		Titanium Dioxide	35	N/A	N/A			Anatase
JRCNM62001a		Titanium Dioxide	21[7]	N/A	N/A			Rutile, thermal, hydrophobic, Al-coated
JRCNM62002a		Titanium Dioxide	21[7]	N/A	N/A			Rutile, thermal, hydrophilic, Al-coated
JRCNM01005a	NM-105	Titanium Dioxide[9]	15-24	N/A	46			Rutile-anatase
JRCNM01001a	NM-101	Titanium Dioxide[9]	5-6	<100 → 95% <50 → 77 % <10 → 11 %	170/ 316			Anatase
JRCNM01101a	NM-111	Zinc Oxide, coated[10]	76[4]	N/A	15			Coated with triethoxycapryl silane
JRCNM62101a		Zinc Oxide, uncoated[10]	70-90[4]	N/A	N/A			Uncoated
JRCNM10404a		Silicon Dioxide	58[8]	N/A	N/A			Synthetic Amorphous Silica, thermal
JRCNM02001a	NM-201	Silicon Dioxide[11]	17-19	<100 → 82%	140			Synthetic Amorphous

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				<50 → 55 % <10 → 1 %				Silica, precipitated
JRCNM02002a	NM-202	Silicon Dioxide[11]	15-20	<100 → 80% <50 → 55 % <10 → 1 %	204			Synthetic Amorphous Silica, thermal
JRCNM02000a	NM-200	Silicon Dioxide[11]	14-23	<100 → 89% <50 → 70 % <10 → 2 %	189			Synthetic Amorphous Silica, precipitated
JRCNM02004a	NM-204	Silicon Dioxide[11]	10-19	<100 → 71% <50 → 36 %	137			Synthetic Amorphous Silica, precipitated
JRCNM02101a	NM-211	Cerium Dioxide[12]	<10 to 20	N/A	65			Precipitated, uncoated
JRCNM03300a	NM-330	Gold	14[5]	N/A				Citrate capped
JRCPD03301a	NM-330 DIS	Gold dispersant	N/A	N/A				
JRCNM04000a	NM-400	MWCNT[13]			254	846	11	
JRCNM04001a	NM-401	MWCNT[13]			140	4048	67	
JRCNM04002a	NM-402	MWCNT[13]			226	1372	11	
JRCNM04003a	NM-403	MWCNT[13]			189[6]	443	12	
JRCNM40001a		MWCNT			>233[4]	~50000[4]	15[4]	Purity > 95%[4] -NH2 content 0.45 wt%[4]
JRCNM40002a		MWCNT			>233[4]	~50000[4]	15[4]	Purity > 95%[4]
JRCNM40003a		MWCNT			>110[4]	10000-30000[4]	30[4]	Purity > 95%[4]
JRCNM40004a		MWCNT			>500[4]	10000-30000[4]	8[4]	Purity > 95%[4] -COOH content 3.86 wt%[4]
JRCNM40005a		MWCNT			>233[4]	~50000[4]	15[4]	Purity > 95%[4] -COOH content 2.56 wt%[4]
JRCNM40006a		MWCNT			>110[4]	10000-30000[4]	30[4]	Purity > 95%[4] COOH content 1.23 wt%[4]
JRCNM40007a		MWCNT			>500[4]	10000-30000[4]	8[4]	Purity > 95%[4] -OH content 5.58 wt%[4]

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JRCNM40008a		MWCNT			>233[4]	~50000[4]	15[4]	Purity > 95%[4] -OH content 3.70 wt%[4]
JRCNM40009a		MWCNT			>110[4]	10000-30000[4]	30[4]	Purity > 95%[4] -OH content 1.76 wt%[4]
JRCNM40010a		MWCNT			N/A	10000-30000[4]	8[4]	Purity > 95%[4]
JRCNM46000a		SWCNT			N/A	N/A	N/A	
JRCNM48001a		Graphene			N/A	N/A	N/A	
JRCNM06000a	NM-600	Nanoclay	288	Percentile D10: mean 631 nm Percentile D50: mean 166 nm Percentile D90: mean 87 nm	52			Bentonite

1 The numbering system for the JRC Representative Nanomaterials stored in the JRC Repository has been revised in order to accommodate more nanomaterials and continue to ensure a high level of traceability. Nanomaterials in the JRC Repository are now identified by the following alphanumeric code (JRC ID): **JRCNMXXXYYa**, where XXXYY is a number that is unique to a single nanomaterial. This alphanumeric code (first column in the table) shall be used in publications to refer to the **nanomaterials** that have been **issued by the JRC Repository.** JRC**PD**ZZZKKa is the code used to indicate the pure dispersant (without nanoparticles) in case of nanomaterials provided as dispersion.

2 Nanomaterials, even of the same chemical composition, can come in various sizes and/or shapes. This may influence their chemical and physical properties

3 Applicable only to JRCNM04XXX series: single-, double- or multi-walled carbon nanotubes (SWCNTs, DWCNTs or MWCNTs)

4 Data provided by the producer/supplier

5 Value obtained via DLS, as reported by the producer

6 Value obtained via SAXS

7 Value obtained via XRD

8 Value obtained via CLS

9 More information in the report *Titanium Dioxide, NM-100, NM-101, NM-102, NM-103, NM-104, NM-105: Characterisation and Physico-Chemical Properties*

10 More information in the report *NM-Series of Representative Manufactured Nanomaterials - Zinc Oxide NM-110, NM-111, NM-112, NM-113: Characterisation and Test Item Preparation*

11 More information in the report *Synthetic Amorphous Silicon Dioxide (NM-200, NM-201, NM-202, NM-203, NM-204): Characterisation and Physico-Chemical Properties*

12 More information in the report *Cerium Dioxide, NM-211, NM-212, NM-213. Characterisation and test item preparation*

13 More information in the report *Multi-walled Carbon Nanotubes, NM-400, NM-401, NM-402, NM-403: Characterisation and Physico-Chemical Properties*