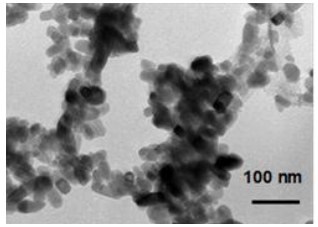
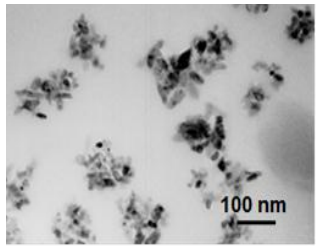
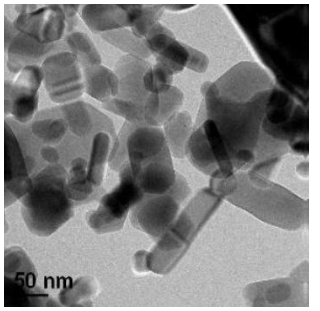
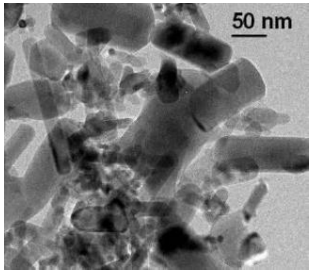
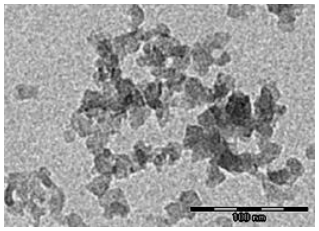
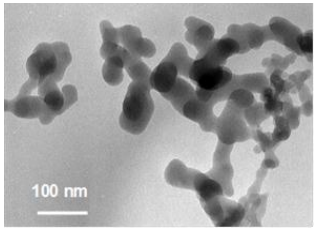
Supporting Information – S1 File

Table A. Physico-chemical parameters of representative oxide NMs (TiO_2, ZnO and SiO_2) used for the *in vitro* studies [21-23]

TiO_2	Composition (wt%)	Surface chemistry	Crystal phase	Crystalline size (nm)	Primary Particle size (nm)	Particle size distribution Number (expressed in %)	Aggregates/ agglomerates size (nm)	Specific surface area (m^2/g)	Zeta potential and IEP (surface charge)	Solubility	TEM images
NM-103	Ti 54.74 O 40.82 Al 3.43 Si 0.68 Fe 0.06 **(EDS)**	2% mass loss **(TGA).** dimethoxydimethyl-silane, silanes (2 wt%) **(GC-MS);** O: 56, C: 25.9, Ti: 10.7, Al: 4.9 , (Fe, Ca: 2.5); at % **(XPS**)	Rutile **(XRD)**	19→28 **(XRD)**	24.7±2.3 **(TEM)**	<100 nm: 51.8%, <50 nm: 12.7 %, <10 nm: 0.1% **(TEM)**	140, fractal dimension Df: 2.2 (SAXS) Morphology: Low sphericity, very angular to sub-angular **(TEM)**	51 **(BET),** 51.1 **(SAXS)**	DI water + buffer: at pH< 4 30 mV; at pH > 8.2 -40mV; IEP: 8.2 (**Zetametry**)	Al, Si detected in 0.05% BSA+water, DMEM, Gamble's solution; NM-103 only in DMEM **(24 h SDR)**	
NM-104	Ti 55.60 O 59.81 Al 3.22 Si 0.18 **(EDS)**	2% mass loss **(TGA).** Tetramethyl silicate, Glycerol; Silane; Hexadecanoic acid methyl ester; Hexadecanoic acid; Octadecanoic acid **(GC-MS);** O: 63.5, C: 16.3, Ti: 13.1, Al: 7.1; at % **(XPS**)	Rutile **(XRD)** Phase transition at 323ºC **(DTA).**	18→29 **(XRD)**	25.0±1.7 **(TEM)**	<100 nm: 53.3%, <50 nm: 12.1%, <10 nm:0.1% **(TEM)**	160, fractal dimension Df: 2.3 **(SAXS).** Morphology: Low sphericity, angular to sub-rounded **(TEM)**	56 **(BET)**, 52.2 **(SAXS)**	DI water + buffer: at pH< 4 30 mV; at pH > 8.2 -40mV; IEP: 8.2 (**Zetametry**)	Al detected in 0.05% BSA+water, DMEM, Gamble's solution; NM-104 only in DMEM **(24h SDR)**	

ZnO	Composition (wt%)	Surface chemistry	Crystal phase	Crystalline size (nm)	Primary Particle size (nm)	Particle size distribution Number (expressed in %)	Aggregates/ agglomerates size (nm)	Specific surface area (m^2/g)	Zeta potential and IEP (surface charge)	Solubility	TEM images
NM-110	Zn 89.90 Ni 0.0009 Pb 0.0008 Co 0.0003 Si 0.0195 Al 0.024 Ca 0.044 **(ICP-OES)**	No weight loss detected **(TGA)** **Uncoated.** C:69, Ce:0.0, O:25.1, Si:0.0, Zn:5.6; at % **(XPS)**	Hexagonal zincite structure **(XRD)**	41.5 **(XRD)**	Two main types of morphology: 1) 20-250 nm , aspect ratio ~1 2) 50-350 nm, aspect ratio 2 - 7.5. Mean diameter ±SD: 158±158 Mean aspect ratio±SD: 1.7 ±0.6 **(TEM)** 151 ± 55.6 (Feret's mean diameter ± 1 SD) **(SEM)**	Relatively high number of small-size Particles, peak-mode around 30 - 40 nm another major broad size mode ca. 200 nm. Merged broad bimodal or clearly bi- or tri-modal in the µm-range **(FMPS/APS)**	275±4 with PDI: 0.145 (in DI water) **(DLS)** 193±3 (in DI water), 309±10 (in seawater) **(CPS)**	12.4±0.6 (**BET)**	In DI water: 24.3±0.4 mV In DI water +5mM NaCl: 20.8±0.8 mV **(Zetasizer)**	2.5 – 4 ppm in DI water after 6-21 days **(Colorimetric test)**	
NM-111	Zn 87.39 Ni 0.0009 Pb 0.0008 Co 0.0003 Si 0.0265 Al 0.027 Ca 0.074 **(ICP-OES)**	1% mass loss **(TGA)** **Coated** with triethoxycapryl silane. C:67.9, Ce:0.0, O:24.3. Si:3.5, Zn:4.3; at % **(XPS)**	Hexagonal zincite structure **(XRD)**	33.8 **(XRD)**	Two main types of morphology: 1) 20-200 nm, aspect ratio ~1 2) 10-450 nm, aspect ratio 2 - 8.5. Mean diameter ±SD: 152±111 Mean aspect ratio±SD: 1.8 ±0.7 **(TEM)** 140.8 ± 65.8 (Feret's mean diameter ± 1 SD) **(SEM)**	Relatively high number of small-size Particles, peak-mode around 30 - 40 nm another major broad size mode ca. 200 nm. Merged broad bimodal or clearly bi- or tri-modal in the µm-range **(FMPS/APS)**	253±1 with PDI: 0.401 (in DI water) **(DLS)**	15.1±0.6 **(BET)**	-	-	

SiO_2	Composition (wt%)	Surface chemistry	Crystal phase	Crystalline size (nm)	Primary Particle size (nm)	Particle size distribution Number (expressed in %)	Aggregates/ agglomerates size (nm)	Specific surface area (m^2/g)	Zeta potential and IEP (surface charge)	Solubility	TEM images
NM-200	Si 44.77 O 53.02 Al 0.46 Na 0.88 S 0.87, traces of Fe, K Mg, Zr **(ICP-OES)**	4% mass loss **(TGA)** O: 70.8, Si: 24.1 , C:4.1 , Na:1 , S:0.06 ; at % **(XPS**)	Synthetic amorphous silica; crystalline impurities of Na_2SO_4 **(XRD)**	amorphous	14 ± 7 **(TEM)**	<100 nm - 88.7%, <50 nm - 69.8% <10 nm - 1.7% **(TEM)**	440, fractal dimension Df: 2.45 **(SAXS)** 200 **(DLS)**, Morphology: Sub-rounded, low to medium sphericity **(TEM)**	189.16 **(BET),** 123.3 **(SAXS)**	In DI water: -47.5 mV IEP <2 In DI water +0.05 % BSA: -18 mV **(Zetametry).**	Al and NM-200 detected in 0.05% BSA+water, DMEM, Gamble's solution **(24 h SDR)**	
NM-203	Si 46.32 O 53.21 Al 0.43 S 0.04 **(EDS)**	No mass loss **(TGA)** O: 71.7, Si: 26, C: 2.3; at% **(XPS)**	Synthetic amorphous silica **(XRD)**	amorphous	13± 6 **(TEM)**	<100 nm - 77.5%, <50 nm - 48.4% <10 nm - 0.3% **(TEM)**	Aggregates with complex open structure. Morphology: Low sphericity, angular. **(TEM)** Polydisperse material **(DLS)**	203.92 **(BET),** 167.2 **(SAXS)**	In DI water: -46.1 mV IEP <2 In DI water +0.05 % BSA: -18 mV **(Zetametry)**	Al and NM-203 detected in 0.05% BSA+water, DMEM, Gamble's solution **(24 h SDR)**	

Abbreviations: CPS – Centrifugal Particle Sedimentation, DLS - Dynamic Light Scattering, DTA - Differential Thermal Analysis, EDS - Energy-Dispersive X-ray Spectroscopy, GC-MS - Gas Chromatography–Mass Spectrometry, ICP-OES - Inductively Coupled Plasma Optical Emission Spectrometry, IEP - Iso-Electric Point, SAXS - Small Angle X-ray Scattering, SEM - Scanning Electron Microscopy, SDR - Sensor Disk Reader, SiO_2 - silicon dioxide, TGA - thermogravimetric analysis, TiO_2 – titanium dioxide, TEM - Transmission Electron Microscopy, ZnO – zinc oxide, XRD - X-ray Diffraction.