



Genotoxicity and Gene Expression in the Rat Lung Tissue Following Instillation and Inhalation of Different Variants of Amorphous Silica Nanomaterials (aSiO₂ NM)

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Table S1. Main physicochemical properties of the tested aSiO₂ and TiO₂ nanomaterials in deionized water [1].

NM property	SiO ₂ _7	SiO ₂ _15_ Unmod	SiO ₂ _15_ Amino	SiO ₂ _40	TiO ₂ _ NM-105
Primary particle size (nm)	8 ^a	15 ^a	15 ^a	40 ^a	21 ^a
Surface area (m ² /g)	249	200 ^a	200 ^a	34	57
Hydrodynamic diameter (nm)	243	48	47	373	394
Zeta potential pH 7.4 (mV)	−39.8	−36.7	−36.4	−40.9	−25.1
Dissolution rate (% w)	0.5	0.5	3.7	0.11	0.01
Redox potential (mV)	258	254	216	260	352
EPR CPH (mass-based)	0.93	0.82	0.92	0.68	0.69
EPR CPH (surface-based)	0.004	0.004	0.005	0.02	0.012
EPR DMPO (mass-based)	0.85	0.57	0.97	0.98	1.01
EPR DMPO (surface-based)	0.003	0.003	0.005	0.029	0.018

Primary particle size as provided by the manufacturer^(a); surface area as determined by Brunauer-Emmett-Teller (BET) and provided by the manufacturer; hydrodynamic diameter as determined by Dynamic Light Scattering (DLS); zeta potential as determined by Electrophoretic Light Scattering (ELS); dissolution rate in a steady-state system after 24 h shaking as determined by Inductively Coupled Plasma Optical Emission Spectrometry ICP-OES; redox potential measured using a potentiometer with platinum (Pt) electrode. Electron paramagnetic resonance (EPR) measurements using the spin probe CPH (EPR CPH) or DMPO (EPR CPH) were conducted - NM were applied at the same mass dose (mass-based) or at the same surface area dose (surface-based) and results were expressed in a sample to blank ratio.

Table S2. Custom TaqMan Array Card (TAC) genes list.

Gene symbol	NM	Name
<i>18s</i>	NR_046237	RNA, 18s ribosomal
<i>Actb</i>	NM_031144	Actin beta
<i>Gapdh</i>	NM_017008	Glyceraldehyde-3-phosphate dehydrogenase
<i>Ppia</i>	NM_017101	Peptidylprolyl isomerase A (cyclophilin A)
<i>A2m</i>	NM_012488	Alpha 2 macroglobulin
<i>Adrb2</i>	NM_012492	Adrenergic receptor, beta 2
<i>Anxa3</i>	NM_012823	Annexin A3
<i>Bdkrb1</i>	NM_030851	Bradykinin receptor B1
<i>Casp1</i>	NM_012762	Caspase 1
<i>Casp3</i>	NM_012922	Caspase 3
<i>CD40</i>	NM_134360	CD40
<i>CD 40 lg</i>	NM_053353	CD 40 ligand
<i>CXCL1</i>	NM_030845	C-X-C motif chemokine ligand 1
<i>GSTA1</i>	NM_031509	Glutathione S-transferase A1
<i>HMOX-1</i>	NM_012580	Heme Oxygenase-1
<i>Hrh1</i>	NM_017018	Histamine receptor H1
<i>Hrh2</i>	NM_012965	Histamine receptor H2
<i>Icam1</i>	NM_012967	Intercellular adhesion molecule 1
<i>IFN-g</i>	NM_138880	Interferon gamma
<i>IL-1b</i>	NM_031512	Interleukin-1 beta
<i>Il1r1</i>	NM_013123	Interleukin 1 receptor type 1
<i>Il1rl1</i>	NM_013037	Interleukin 1 receptor like 1
<i>IL-6</i>	NM_012589	Interleukin-6
<i>IL-10</i>	NM_012854	Interleukin-10
<i>Itga1</i>	NM_030994	Integrin subunit alpha L
<i>Itgam</i>	NM_012711	Integrin subunit alpha M
<i>Itgb1</i>	NM_017022	Integrin subunit beta 1
<i>Itgb2</i>	NM_001037780	Integrin subunit beta 2
<i>Mapk3</i>	NM_017347	Mitogen-activated protein kinase 3
<i>Mapk8</i>	NM_053829	Mitogen-activated protein kinase 8
<i>Mapk14</i>	NM_031020	Mitogen-activated protein kinase 14
<i>Nos2</i>	NM_012611	Nitric oxide synthase Inducible
<i>NQO1</i>	NM_017000	NAD(P)H dehydrogenase quinone 1
<i>OGG1</i>	NM_030870	8-oxoguanine DNA glycosylase
<i>Pde4d</i>	NM_001113328	Phosphodiesterase 4B; cAMP specific
<i>Pla2g7</i>	NM_001009353	Phospholipase A2; group VII (platelet-activating factor acetylhydrolase; plasma)
<i>Plcb2</i>	NM_053478	Phospholipase C; beta 2
<i>Plcb3</i>	NM_033350	Phospholipase C; beta 3
<i>Plcd1</i>	NM_017035	Phospholipase C delta 1

<i>Ptgir</i>	NM_001077644	Prostaglandin I2 receptor
<i>Ptgis</i>	NM_031557	Prostaglandin I2 synthase
<i>Ptgs1</i>	NM_017043	Prostaglandin-endoperoxide synthase 1
<i>Ptgs2</i>	NM_017232	Prostaglandin-endoperoxide synthase 2
<i>RPLPO</i>	NM_022402	Ribosomal protein lateral stalk subunit P0
<i>SOD2</i>	NM_017051	Superoxide Dismutase 2
<i>TNF</i>	NM_012675	Tumor Necrosis Factor-alpha
<i>Tnfrsf1a</i>	NM_013091	TNF receptor superfamily member 1A
<i>Vcam1</i>	NM_012889	Vascular Cell Adhesion Protein 1

Reference

1. Bahl, A.; Hellack, B.; Balas, M.; Dinischiotu, A.; Wiemann, M.; Brinkmann, J.; Luch, A.; Renard, B.Y.; Haase, A. Recursive feature elimination in random forest classification supports nanomaterial grouping. *NanoImpact* **2019**, *15*, 100179.