

Supplementary file

Agglomeration state of titanium-dioxide (TiO_2) nanomaterials influences the dose deposition and cytotoxic responses in human bronchial epithelial cells at the air-liquid interface

Sivakumar Murugadoss ^{1¶}, Sonja Mülhopt ^{2¶*}, Silvia Diabaté ³, Manosij Ghosh ¹, Hanns-Rudolf Paur ², Dieter Staph ², Carsten Weiss ^{3#}, Peter H. Hoet ^{1#}

¹ KU Leuven, Environment and Health, Leuven, 3000, Belgium

² Institute for Technical Chemistry, Karlsruhe Institute of Technology, Karlsruhe, Germany

³ Institute of Biological and Chemical Systems - Biological Information Processing, Karlsruhe Institute of Technology, Karlsruhe, Germany

* Correspondence: sonja.muelhopt@kit.edu; Tel.: +49-721-608 23807

¶ & # equal contribution

Figure S1 and Table S1 – provided in supplementary as they are published elsewhere [1]

Figure S1: Representative TEM micrographs of freshly prepared TiO₂ stock dispersions of small (SA) and large agglomerates (LA). 17nm-SA (A), 17nm-LA (B), 117nm-SA (C) and 117nm-LA (D).

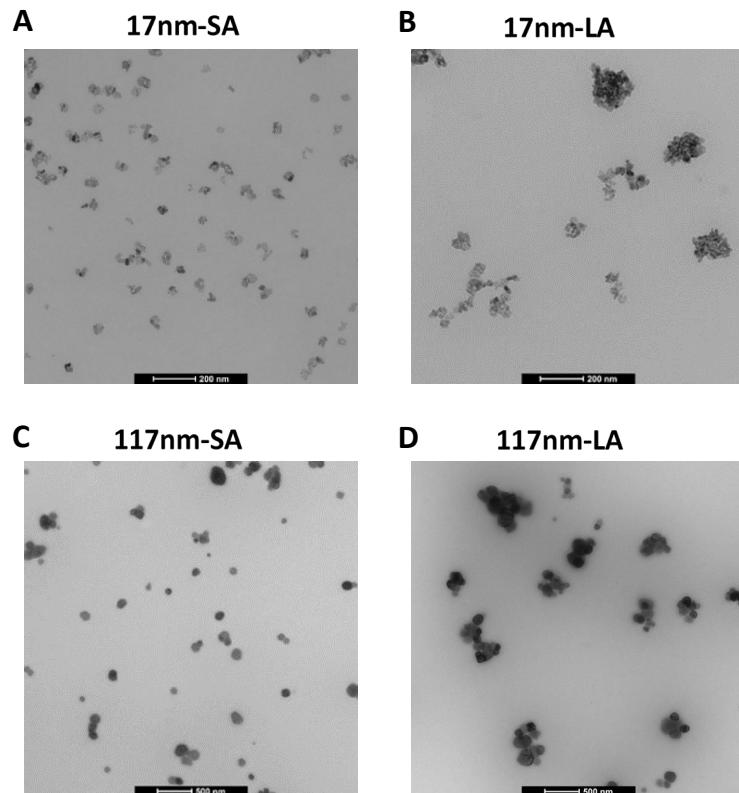
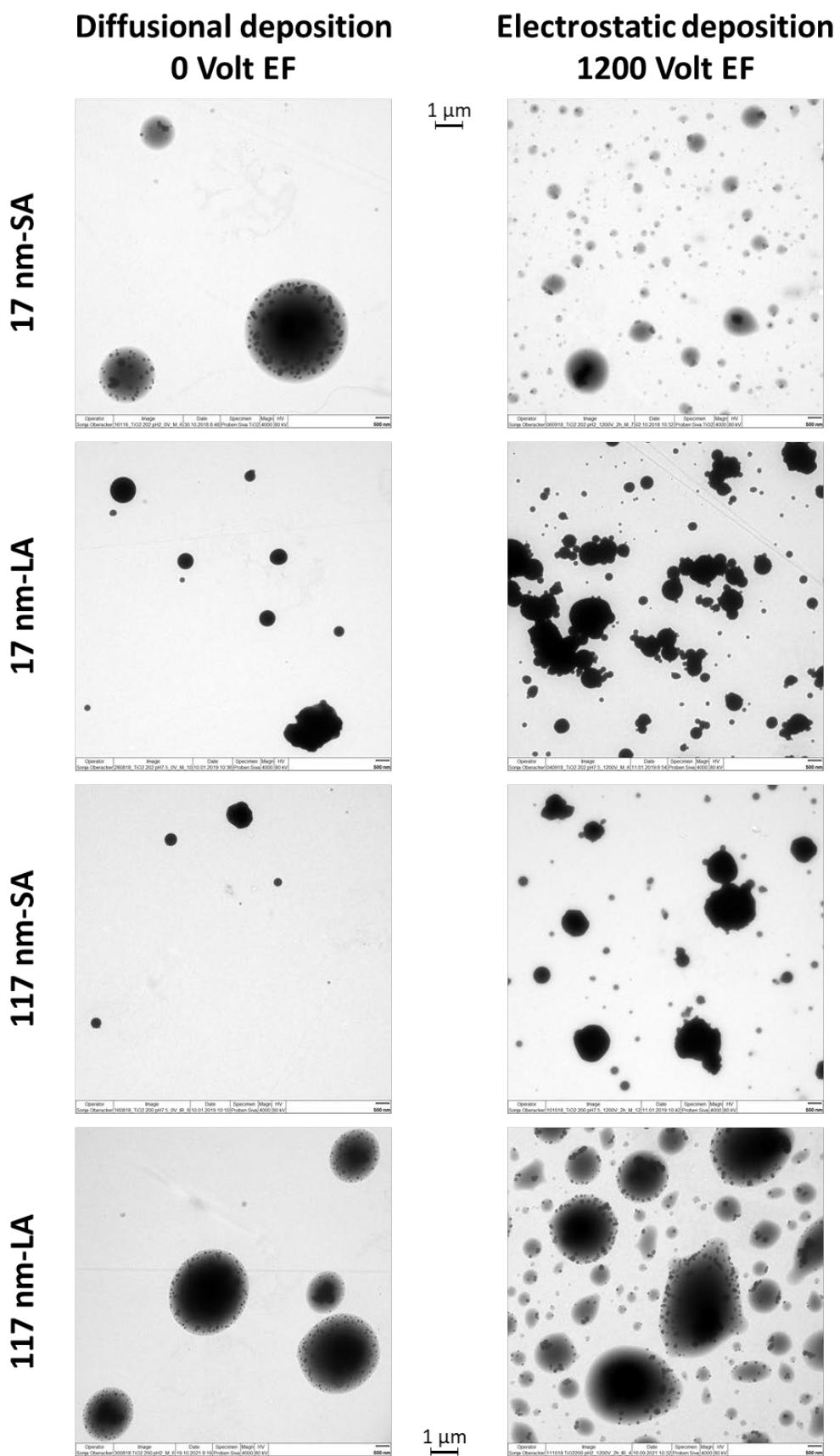


Table S1: Characterization of freshly prepared TiO₂ stock dispersions (2.56 mg/mL).

Stock suspension	Description	TEM			PTA	DLS	DLS
		Median ECD (nm)	Mean ECD (nm)	Mean Feret min (nm)	Mean Hydrodynamic size (nm)	Z-average (nm)	Zeta potential (mV)
17nm-SA	Small agglomerates of 17 nm sized TiO ₂ NP	18	100	33	134	600	33
17nm-LA	Large agglomerates of 17 nm sized TiO ₂ NP	127	200	120	207	900	-37
117nm-SA	Large agglomerates of 117 nm sized TiO ₂ NP	122	250	148	259	280	-46
117nm-LA	Large agglomerates of 117 nm sized TiO ₂ NP	352	500	309	221	580	15

Median and mean equivalent circle diameter (ECD) and mean feret minimum (feret min) measured by transmission electron microscopy (TEM), Z-average (mean hydrodynamic size) by dynamic light scattering (DLS) and mean hydrodynamic size by particle tracking analysis (PTA).

Figure S2: TEM micrographs of aerosolized TiO₂ agglomerates collected over 4h exposure without (0 V) and with (1200 V) electrostatic field (EF) at the ALI exposure system. Magnification 4000 at 80 kV



Reference

1. Murugadoss S, Brassinne F, Sebaihi N, Petry J, Cokic SM, Landuyt KL Van, et al. Agglomeration of titanium dioxide nanoparticles increases toxicological responses in vitro and in vivo. Particle and Fibre Toxicology; 2020;7:1–14.