

Supplementary Information

Supplementary table 1: A summary of the physico-chemical characteristics of the different nano-objects exposed to the TA98, TA100, TA1535 and TA1537 strains of *S. typhimurium*. The table highlights the key physico-chemical characteristics of each nano-object as previously reported^[1-9]. The shape (morphology) and form of each nano-object is described in the table below (row 6) and the given references provide qualitative data to these descriptions. The specific methodology used to determine each property stated is detailed in the specific references provided^[1-8].

| Characteristic (method used) | Au-PMA-ATTO NPs | CAFs | CeO ₂ NPs | DEPs | SWCNTs | MWCNTs |
|------------------------------|--|---|---|--|---|--|
| Length (µm) (TEM) | N/A | 3-50 ^{[1-4]*} | N/A | N/A | 0.5-3 ^[5] | 1-10 ^[1-4] |
| Diameter (nm) (DLS/TEM/XDC) | 15 (spherical) ^[6] | 5-30 (width) ^[1-4] | 24nm (hydrodynamic diameter) ^[7] | 168 ± 13 ^[8] | 20 (width) ^[5] | 100 (width) ^[1-4] |
| Core-size (nm) (DLS) | 4 ^[6] | N/A | N/A | N/A | N/A | N/A |
| Shape (Form) (TEM) | Spherical (monodispersed) ^[6] | Fibrous (fragmented) ^[1-4] | Crystalline (aggregated) ^[7] | Aggregated ^[9] | Fibrous (bundled) ^[1] | Fibrous (bundled) ^[1-4] |
| Elemental Contaminants (%wt) | N/A | Fe (15.1) ^[1-4] Mn (0.09) ^[1-4] Cr (0.002) ^[1-4] Ni (0.001) ^[1-4] Co (0.001) ^[1-4] | N/A | Elemental C (60) ^[9] Organic C (5) ^[9] Carbonate (>1) ^[9] | Ni (5.5) ^[1] Y (0.7) ^[1] | Fe (0.05) ^[1-4] Mg (0.01) ^[1-4] Ni (0.12) ^[1-4] Co (<0.001) ^[1-4] |
| Endotoxin Content (LAL test) | ND ^[9] | ND ^[1-4] | ND ^[7] | ND ^[9] | ND ^[1] | ND ^[1-4] |

N/A: Characteristic not applicable/associated with the specific nano-object.

***:** refers to percentage of CAFs (by number); Length (μm) 3-5 (53.8%), 5-10 (36%), 10-25 (9.2%), 25-50 (1.0%), >50 (0.1%)^[1-4].

ND: Below the detectable limit of the equipment/assay.

Abbreviations used in Supplementary table 1

Au-PMA-ATTO NPs: Gold core nanoparticles with a propylene glycol monomethyl ether acetate polymer shell

CAFs: Crocidolite asbestos fibres.

CeO₂ NPs: Cerium dioxide nanoparticles.

DEPs: Diesel exhaust particles.

SWCNTs: Single-walled carbon nanotubes.

MWCNTs: Multi-walled carbon nanotubes.

TEM: Transmission electron microscopy.

DLS: Dynamic light scattering.

XDC: X-ray disc centrifugation.

LAL: Limulus Amebocyte Lysate Endotoxin test.

References used in Supplementary table 1:

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