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Electronic Supplementary Material

Dendrimeric Antigens-Silica Particles Composites: An Innovative Approach for IgE Quantification.

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1. TEM images of the obtained particles

A suspension of monodisperse sub-micron silica-based spheres was obtained following the Stöber's standard method.

It is found from figure 1 that no clears differences in size and morphology between SiO_2 and SiO_2-DG_2 were observed, suggesting: 1) the additional organic group does not increase the volume of the inorganic particle obviously and 2) no aggregation occurs during the surface modification process.

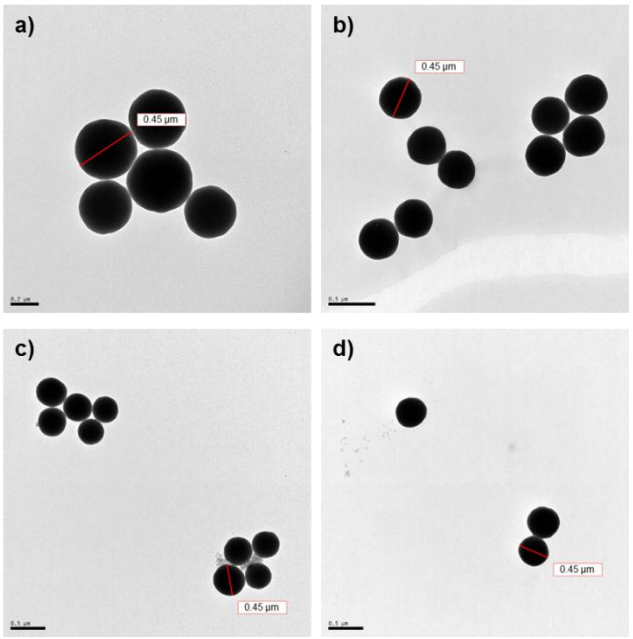

Figure S1. TEM images of the obtained particles: a) SiO_2; b) SiO_2-APS; c) SiO_2-Suc; d) SiO_2-DG_2.

2. Calculation of numbers of spheres and surface area per gram of SiO_2.

Values were calculated on the assumption that the silica particles were perfect spheres of 2.2 g/cm^3 density.

Density of SiO_2 particles: 2.2 g/cm^3

Diameter of 1 sphere = 450 nm

Volume of 1 sphere: $4/3\pi r^3$; $V = 4/3\pi(450/2\ nm)^3 = 47.7x10^6\ nm^3$

Mass of 1 sphere: $47.7x10^6\ nm^3 \times 2.2 \cdot g/10^{-21} nm^3 = 1.05x10^{-13}$ g

Number of spheres per gram of SiO_2 sample:

$1\ g \times 1\ sphere/1.05x10^{-13}\ g = 9.5x10^{12}$ spheres

Area of 1 sphere: $4\pi r^2$; $A = 4\pi(450/2\ nm)^2 = 63.6x10^4\ nm^2$

Surface area per gram of SiO_2 sample:

$63.6x10^4\ nm^2/sphere \times 9.5x10^{12}$ spheres $= 6.1x10^{18}\ nm^2$

3. Calculation of functional groups in the spheres.

30 µmol amino groups per gram of SiO_2-DG_2 sample.

PAMAM-G2 per gram of SiO_2-DG_2 sample:

30 µmol amino groups x 1 µmol PAMAM-G2/15 µmol amino groups = 2 µmol PAMAM-G2

$2x10^{-6}$ mol PAMAM-G2 x $6.02x10^{23}$ PAMAM-G2/mol PAMAM-G2 = $12x10^{17}$ PAMAM-G2

PAMAM-G2 per nm^2:

$12x10^{17}$ PAMAM-G2/g SiO_2 x 1 g $SiO_2/6.1x10^{18}\ nm^2 = 0.2$ PAMAM-G2/nm^2