Electronic supplementary information

Virosome Engineering of Colloidal Particles and Surfaces: Bioinspired Fusion to Supported Lipid Layers

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Virosomes Labeling with R18

The R18 assay requires the R18-labeling of the lipid membrane, in this case the virosomes. Therefore, 10 µl R18 (Sigma-Aldrich, 4 mM R18 in distilled water) was added to 100 µl virosome solution (7 mg/ml total lipid) [5 mol% R18/ mol lipid]. After gently mixing, the solution was incubated at room temperature for 1 h under constant shaking (500 rpm) in the dark. After labeling surplus R18 was removed by sephadex G50 chromatography. Elution was performed in PBS buffer (pH 7.4). The eluate was collected in 100 µl fractions. For detection of the virosome product in the eluate fractions, protein quantification was performed by BCA assay (Thermo Fisher Scientific). Virosomes contain hemagglutinin, which is the membrane fusion protein of influenza. The successful R18-labeling of virosomes and self-quenching of R18 was controlled for each experiment of R18-labeling of virosomes [Figure S3]. The R18 quenching was normally about 50 – 70 %. If the quenching % of R18-labeled virosomes was lower than 50 %, it was not used for fusion experiments.

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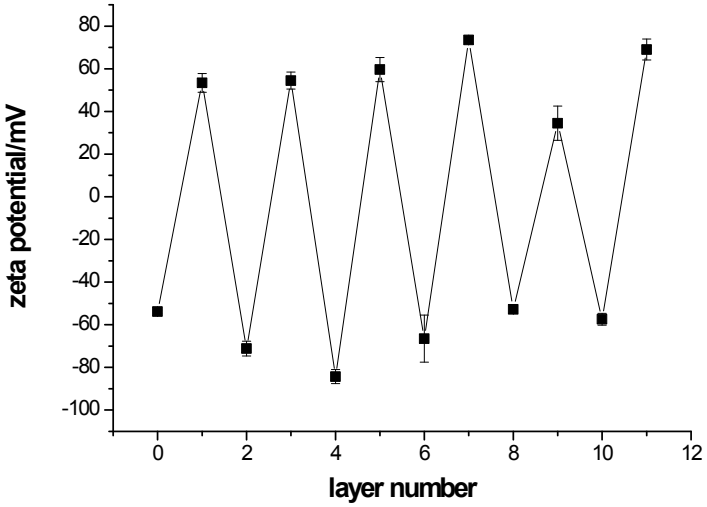

Figure S1. Zeta potential changes during the layer-by-layer coating of silica particles. 3 µm sized silica particles were coated with a multilayer of polyelectrolytes $(PAH/PSS)_{5.5}$. The coating with positively charged PAH and negatively charged PSS was detected by the change of the zeta potential. The zeta potential was measured in 1 mM Tris buffer (pH 7).

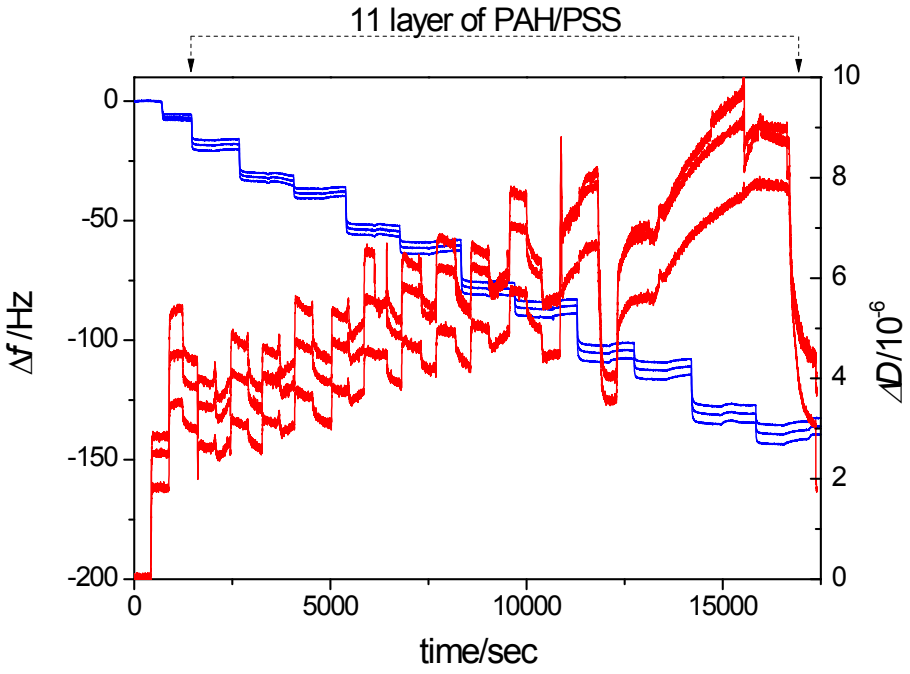

Figure S2. Frequency (blue curves) and dissipation (red curves) changes monitored by QCMD during the PEM deposition of the assembly of 11 layer of PAH/PSS.

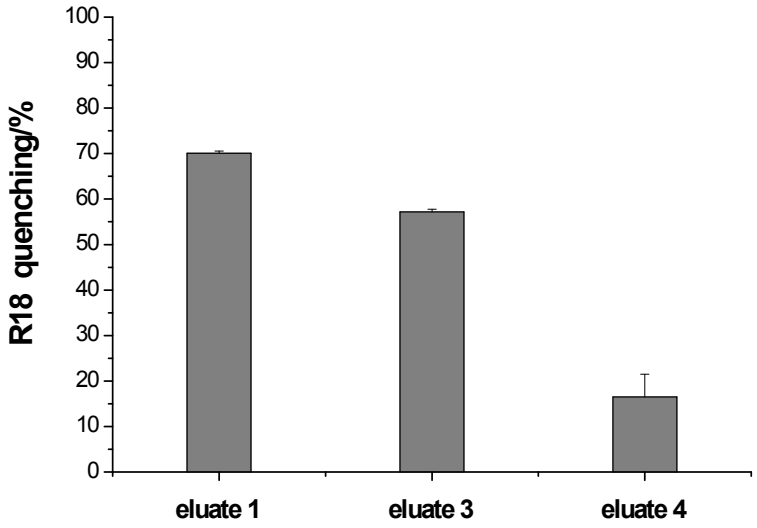

Figure S3. Self-quenching of R18-labeled virosomes. The quenching % was calculated with $(F-F_0)/F$ *100. F_0 is the fluorescence intensity before lysis and F of the fluorescence intensity after lysis (addition of Triton X-100).

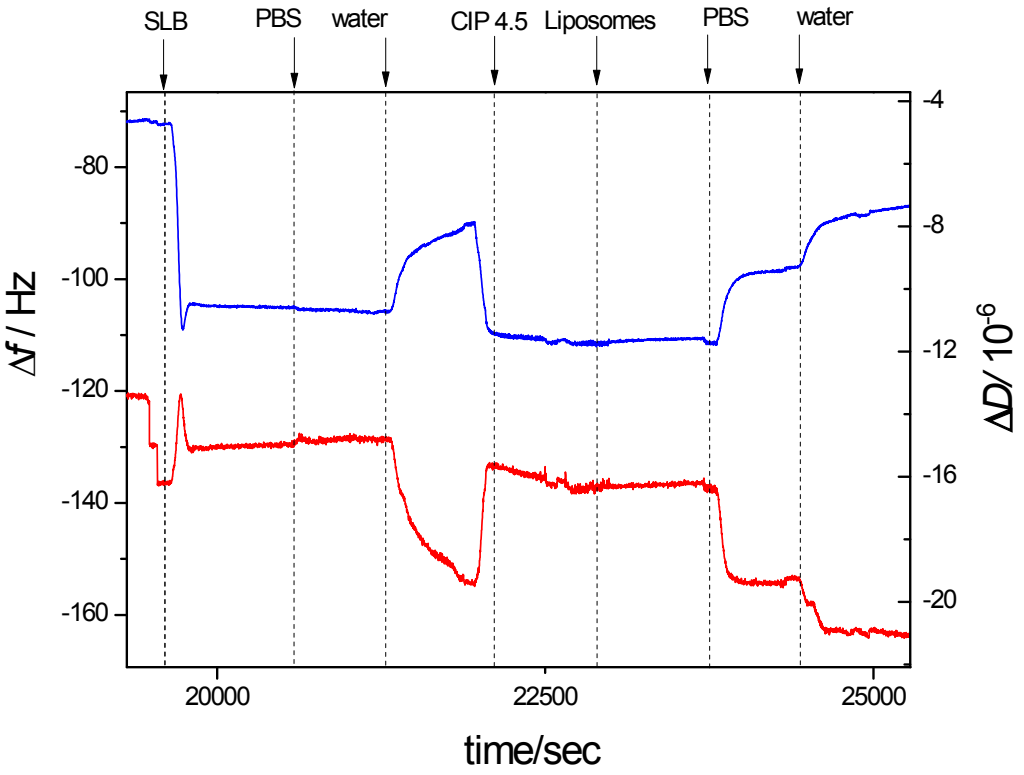

Figure S4. Frequency (blue curves) and dissipation (red curves) changes by the deposition of IRIVs like liposomes to the phospholipid bilayer deposited on a PEM of 11 layer of PAH/PSS in acidic pH (CIP 4.5). The liposomes are equivalent to the IRIVs in their formulation but without the fusion-active hemagglutinin. In the QCM-D curve we can also appreciate first the assembly of a lipid bilayer on PEMs. Once the lipid bilayer is formed the pH of the media is reduced to 4.5 and then the virosomes like liposomes are added.