Supporting Information

Construction and modelling of concatemeric DNA multilayers on a planar surface as monitored by QCM-D and SPR

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1. Base sequences of Oligonucleotides.

Table 1. Oligonucleotides for assembly of concatemers.

Name	No of bases	Oligonucleotide sequence from 5′ to 3′
b-AB_{59}	59	TTTTTGATCTCTCGGACTAACCCTGAGGTCAGCGCCAGTGAGAGTGCTGCATTCACGGT
A'_{34}	34	CGCTGACCTCAGGGTTAGTCCGAGAGATCAAAAA
A'B'	50	CGCTGACCTCAGGGTTAGTCCGAGAACCGTGAATGCAGCACTCTCACTGG
AB	50	TCTCGGACTAACCCTGAGGTCAGCGCCAGTGAGAGTGCTGCATTCACGGT
A	25	TCTCGGACTAACCCTGAGGTCAGCG

2. Effective shear elastic modulus (μ) for single DNA layer using the extended (frequency-dependent) Voigt model, based on the fits shown in Figure 3 of main text.

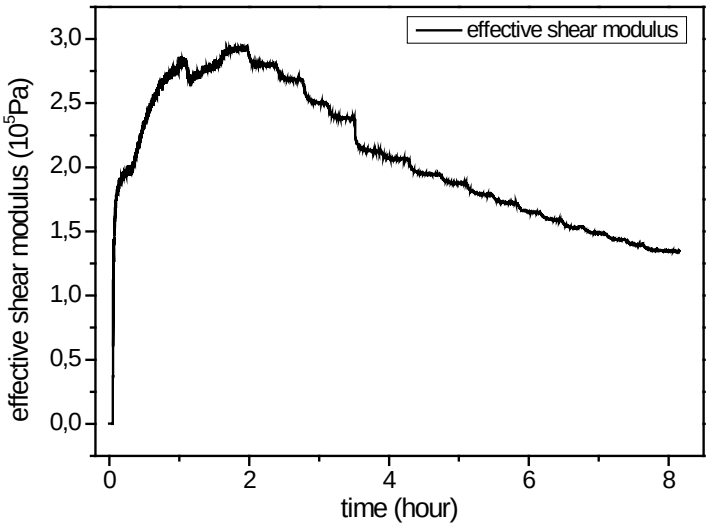

Figure S1. Effective shear modulus during the step-wise assembly of a 534bp concatemer film, obtained by Voigt-based modeling using a single DNA layer with frequency-dependent viscoelastic parameters.

3. Fit of experimental data to a two-layer Voigt model.

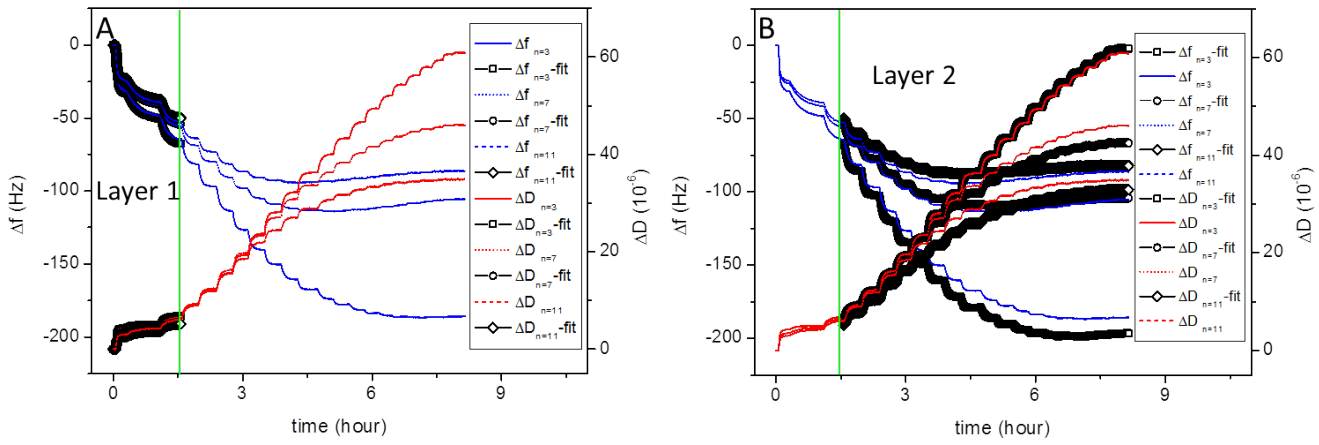

Figure S1. Experiment data (lines) and two layer Voigt-based modeling (lines + symbols) on the changes in frequency (Δf) and dissipation (ΔD) versus time for stepwise assembly of a 534 bp ds DNA concatemer layer, at overtone n=3 (solid, solid+squares), n=7 (dotted, dotted+circles) and n=11 (dashed, dashed+triangles). (A) The first three hybridization steps modeled as layer 1. (B) The subsequent steps modeled as layer 2.

4. QCM-D data for 534bp concatemers assembled in high salt PBS buffer (5mM NaH_2PO_4, 5mM Na_2HPO_4, 537 mM NaCl, 127KCl, pH 7.4) solution and the Voigt-modeled viscoelastic properties.

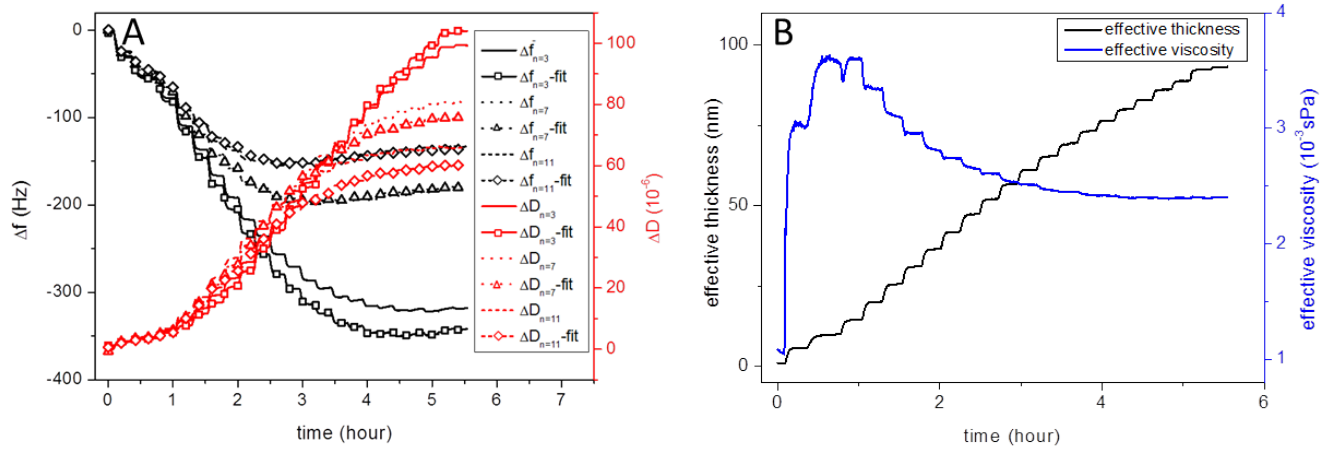

Figure S3. (A) Experiment data (lines) and Voigt-model (lines + symbols) on the changes in frequency (Δf) and dissipation (ΔD) versus time for stepwise assembly of a 534 bp ds DNA concatemer layer in 10mM PBS buffer (537 mM NaCl, 127KCl, pH 7.4), at overtone n=3 (solid, solid + squares), n=7 (dotted, dotted + circles) and n=11 (dashed, dashed + triangles). (B) Changes in effective thickness (black; left axis) and effective shear viscosity (blue; right axis) versus time during the step-wise DNA-assembly as obtained from the Voigt-based modeling shown in A.

5. Standard Voigt-based modeling

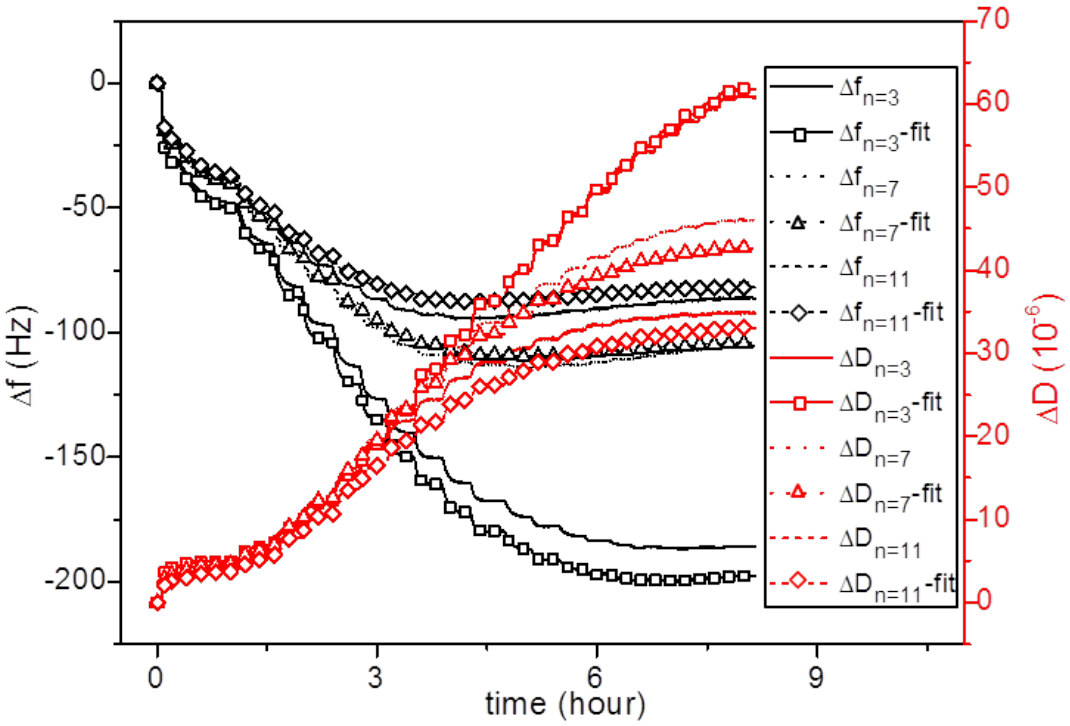

Figure S4. Experimental data and modeling results for a 534 bp DNA film using the standard Voigt model. (Lines) QCM-D data on changes in frequency **(**Δf) and dissipation (ΔD) versus time at overtones n=3 (solid), 7 (dotted) and 11 (dashed) during the 20 step oligonucleotide hybridization when the semi-complementary oligonucleotides A'B' (10 times) and AB (9 times) are hybridized to the platform in Figure 1. The zero levels for Δf and ΔD correspond to a fully formed SA layer (Figure 1). (Lines + symbols) Voigt-based modeling for overtones n=3 (squares), n=7 (triangles) and n=11 (diamonds) using the standard model of a single-layer film with frequency-independent viscoelastic parameters.