Electronic Supplementary Material (ESI) for RSC Advances.

Step-by-step deposition of type B gelatin and tannic acid displays a peculiar ionic strength dependence at pH 5

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Supplementary Information

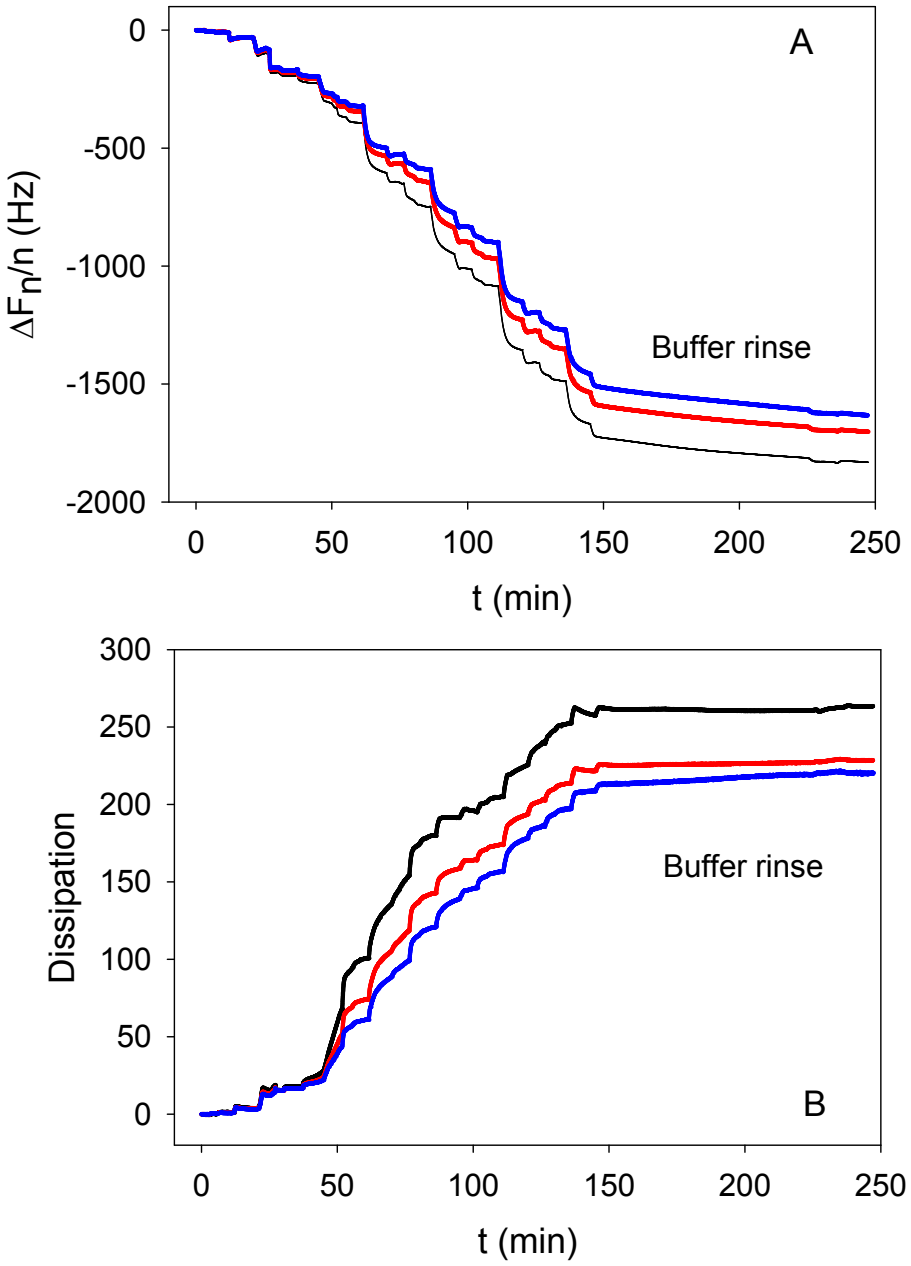

Fig. 1: Deposition kinetics of a PEI-(gelatin-TA)$_5$-gelatin film on a silica coated quartz crystal in the presence of 10 mM sodium acetate buffer (total ionic strength: 6.4 mM). A: reduced frequency changes as followed at the third (——), fifth (——) and seventh (——) overtone of the crystal. B; energy dissipation changes as followed at the third (——), fifth (——) and seventh (——) overtone of the crystal.

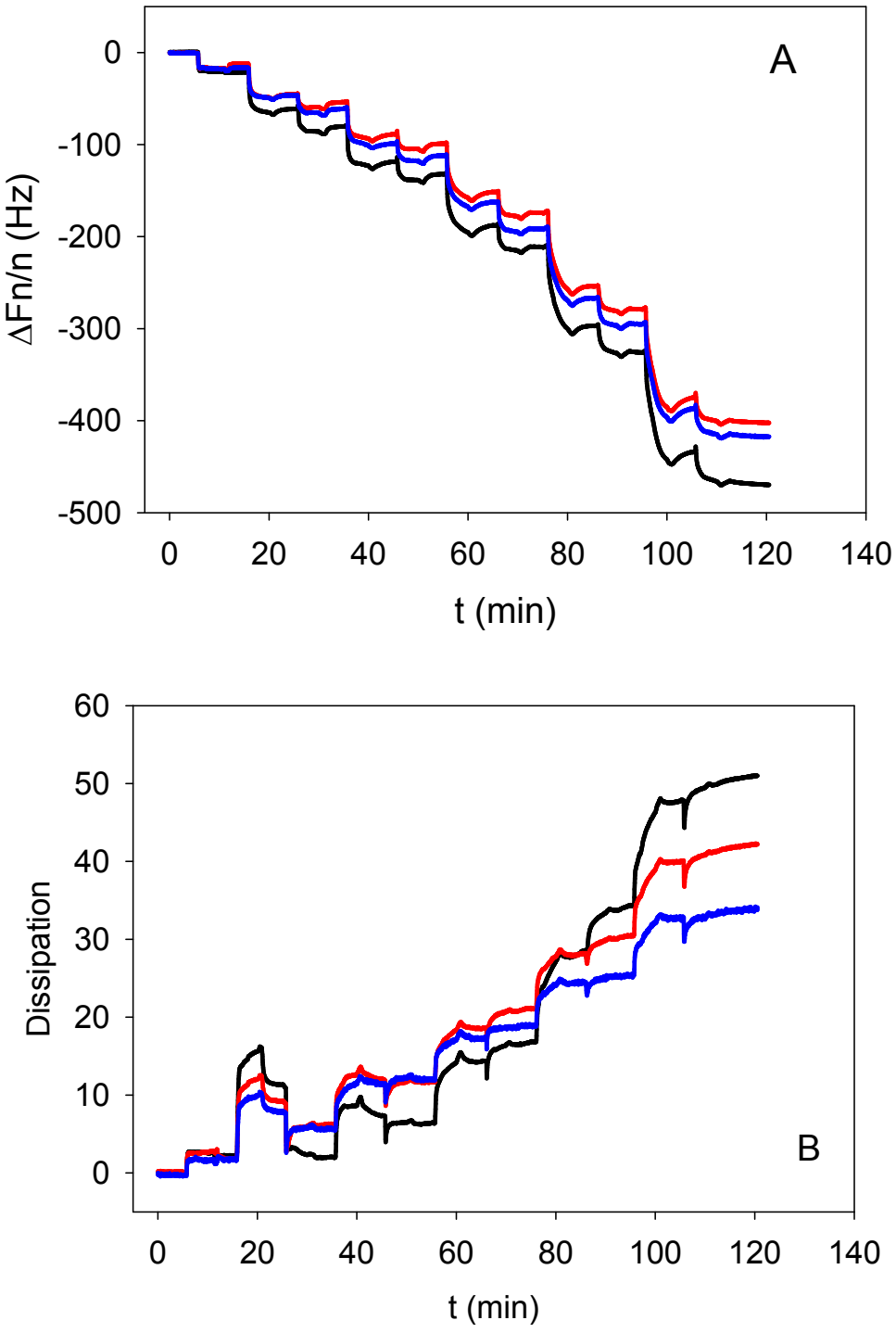

Fig 2: Deposition kinetics of a PEI-(gelatin-TA)$_5$-gelatin film on a silica coated quartz crystal in the presence of 50 mM sodium acetate buffer + 150 mM NaCl (total ionic strength: 182 mM). A: reduced frequency changes as followed at the third (——), fifth (——) and seventh (——) overtone

of the crystal. B; energy dissipation changes as followed at the third (——), fifth (——) and seventh (——) overtone of the crystal.

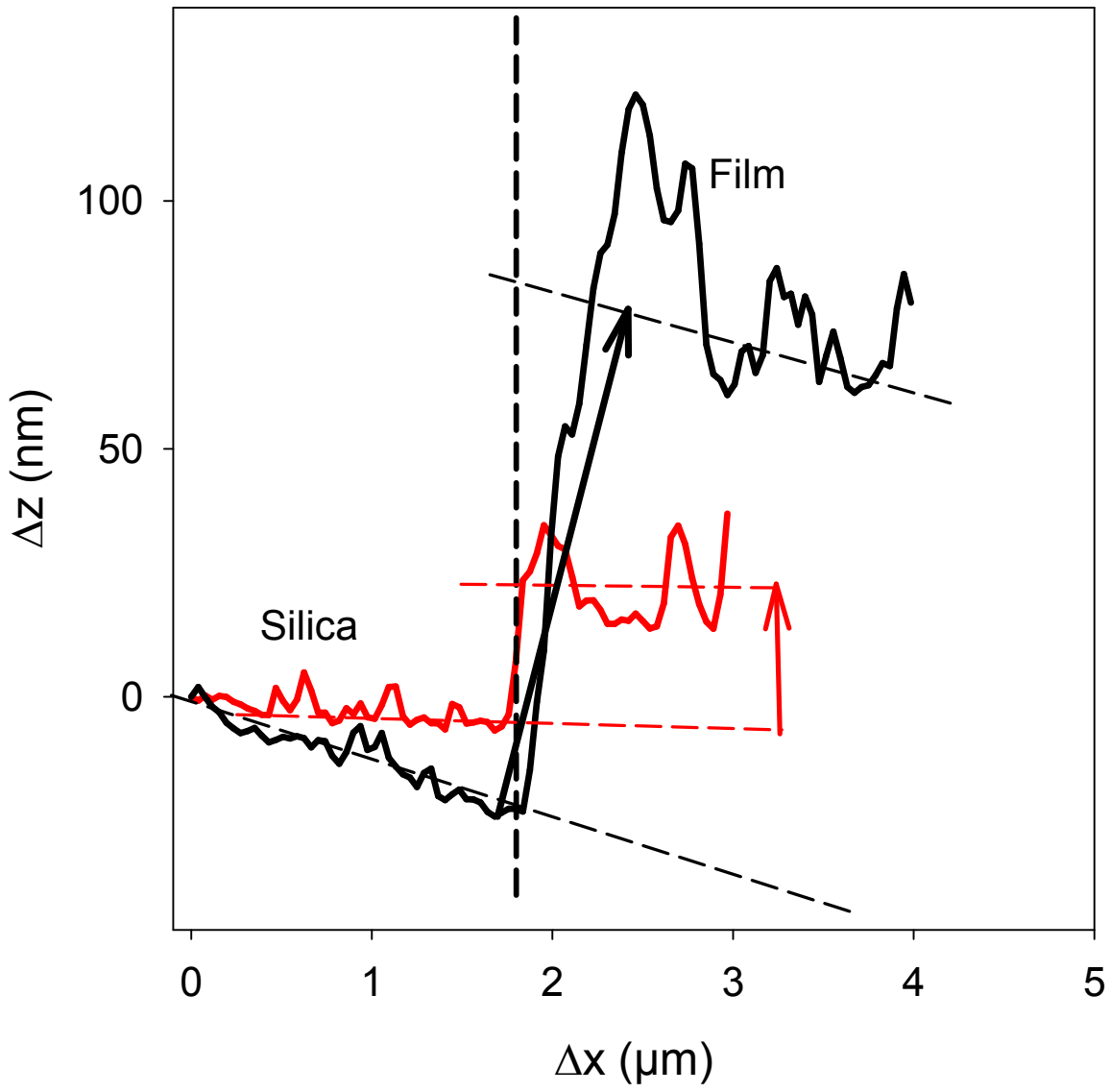

Fig. 3: Height profiles obtained through contact mode AFM images in a direction perpendicular to needle scratched lines for PEI-(gelatin-TA)$_5$-gelatin films prepared in the presence of 10 mM sodium acetate buffer (——) and 50 mM sodium acetate buffer + NaCl 100 mM (——).

The short dashed lines indicate the average profile over the silicon substrate and over the film. The height of the film is determined from the height difference between those lines as indicated with the colored arrows.

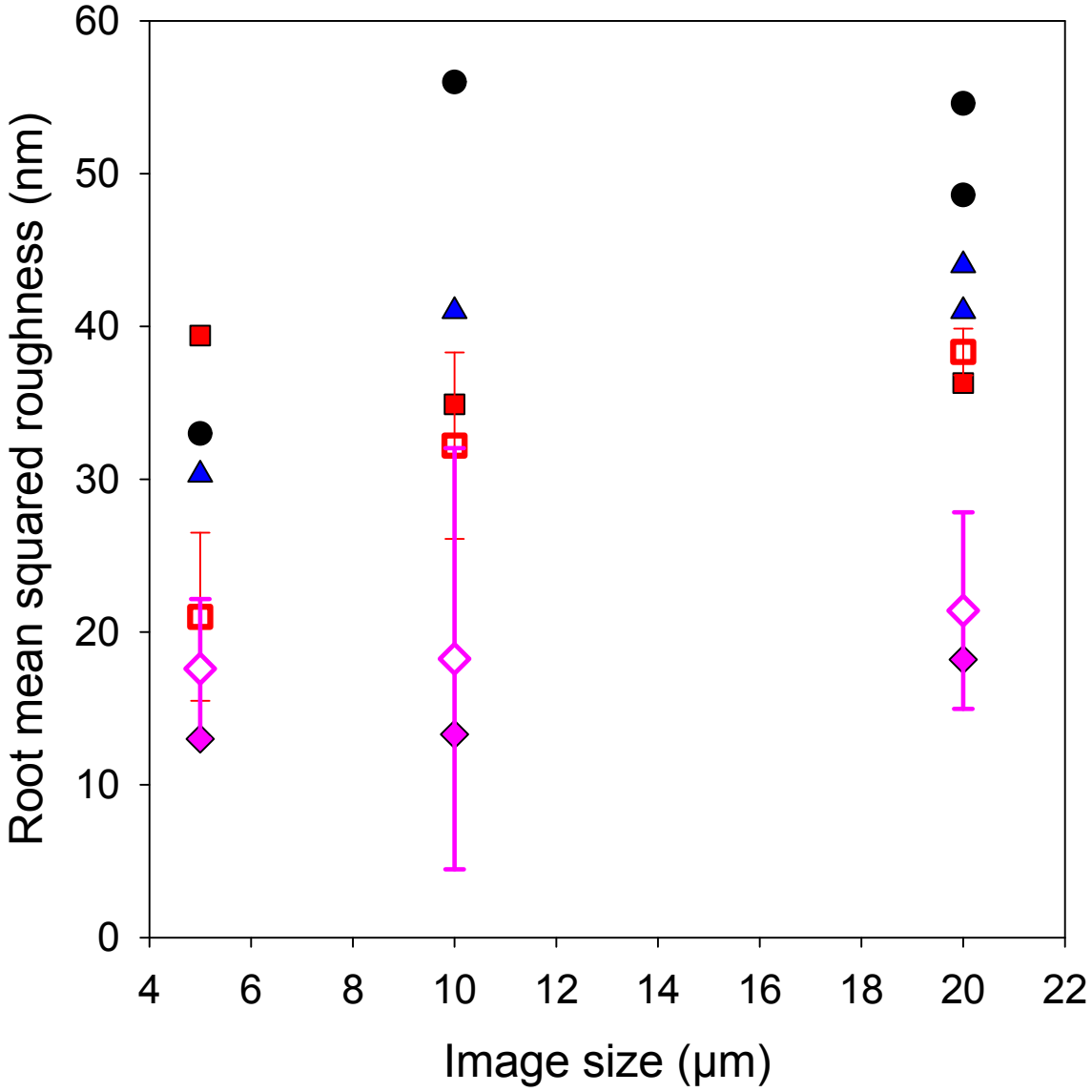

Fig. 4: Root mean squared roughness of PEI-(gelatin-TA)$_5$-gelatin films for different image sizes as a function of the total ionic strength used during the film deposition: 6.4 mM (●), 132 mM (○), 182 mM (□) and 532 mM (◴), each of the data points corresponds to an individual measurement. Data were also acquired on 3 independently chosen locations on independently prepared films at an ionic strength of 182 mM (◎) and 532 mM (✵). The error bars correspond to one standard deviation.

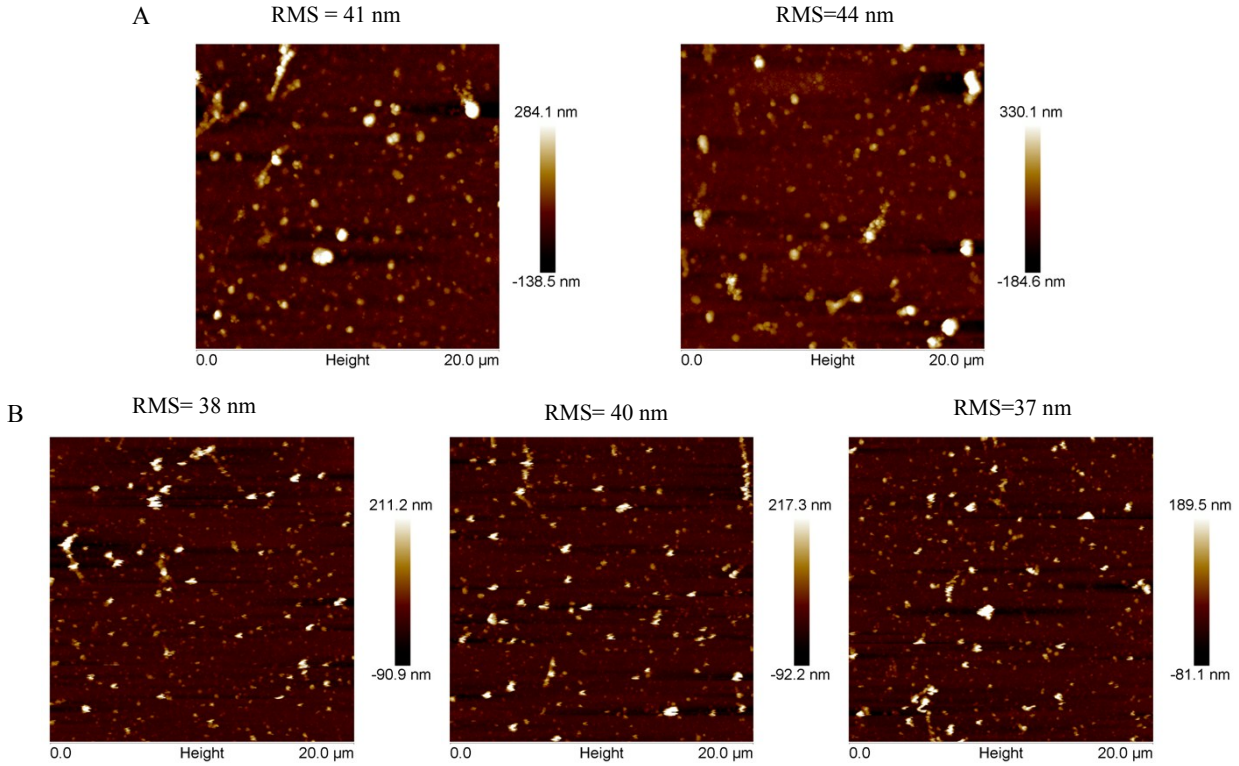

Fig. 5: Representative AFM topographies (20 µm x 20 µm) of PEI-(gelatin-TA)$_5$-gelatin films prepared in the presence of 50 mM sodium acetate buffer + 150 mM NaCl (total ionic strength of 182 mM). The root mean squared roughness values are given on top of the topographies.

Row A and B correspond to films prepared in an independent manner.

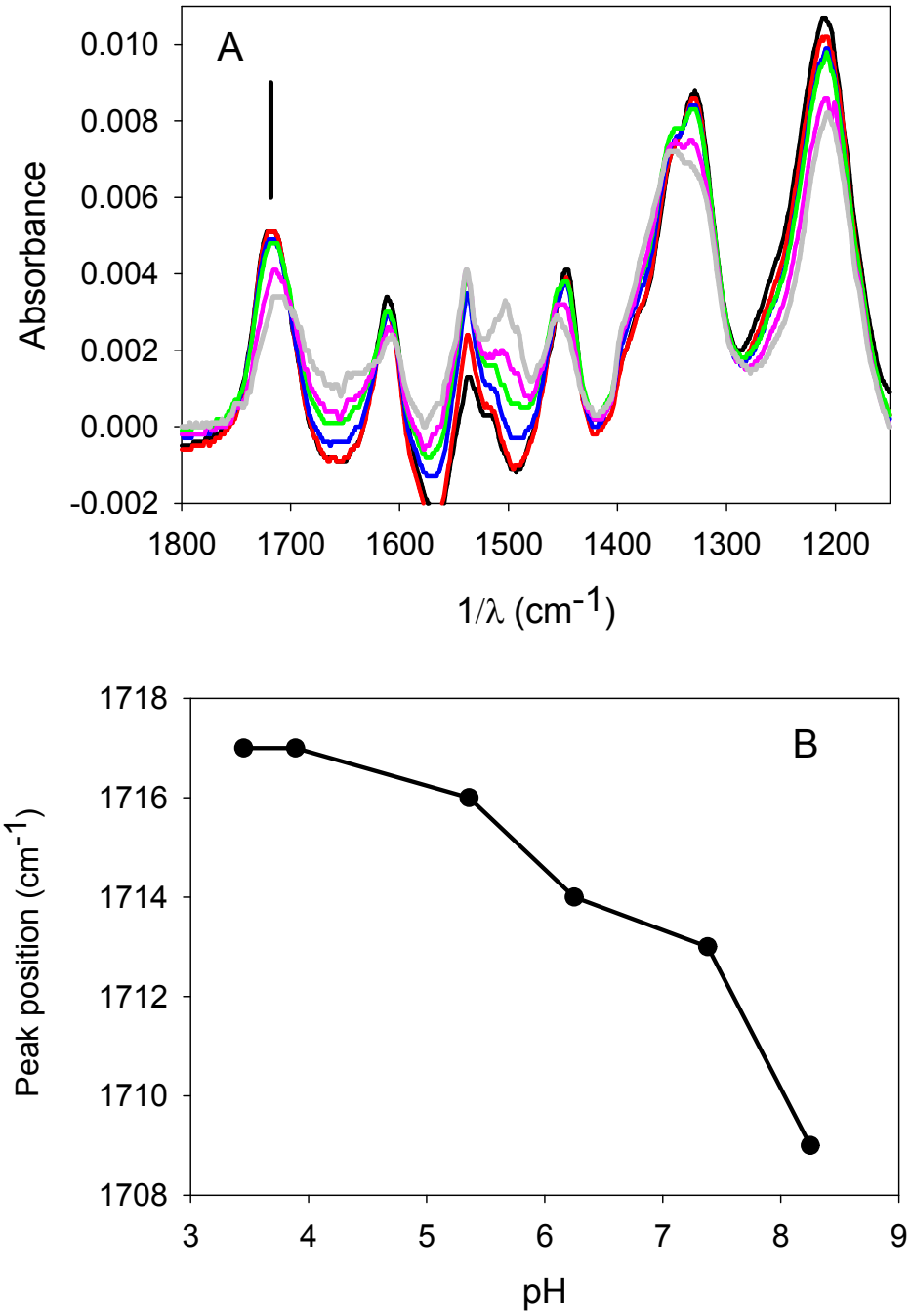

Fig. 6: A: Infra-red spectra of a 10 mg.mL^{-1} TA solution as a function of the pH: pH = 3.45 (——), 3.89 (——), 5.36 (——), 6.25 (——), 7.38 (——), 8.25 (——). B: Evolution of the peak labelled with a vertical line in part A as a function of pH.

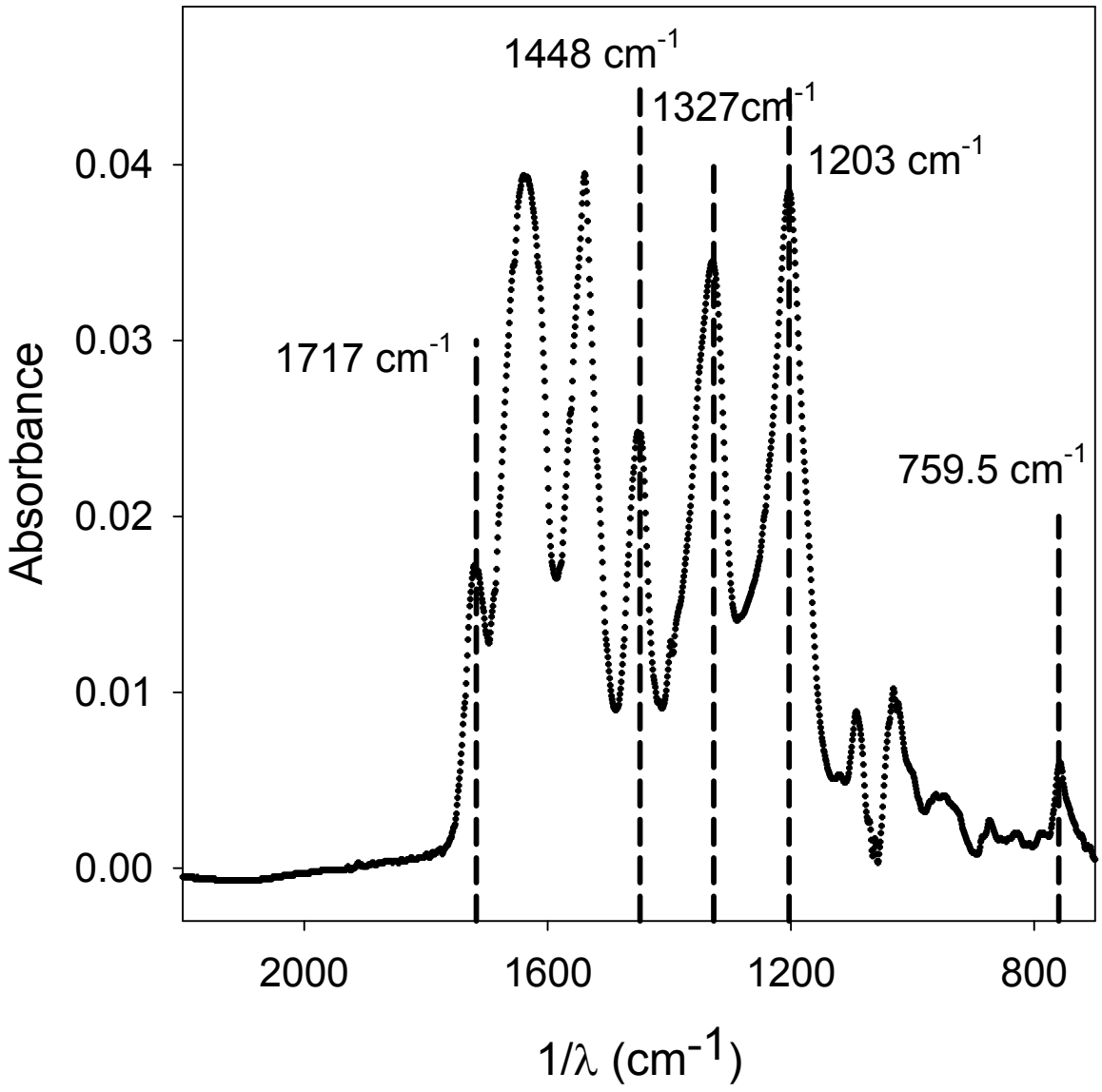

Fig. 7: Point data representation of the ATR-FTIR spectrum of a PEI-(gelatin-TA)$_5$-gelatin film deposited on the ZnSe reflection element in the presence of 10 mM sodium acetate buffer at pH = 5.0.

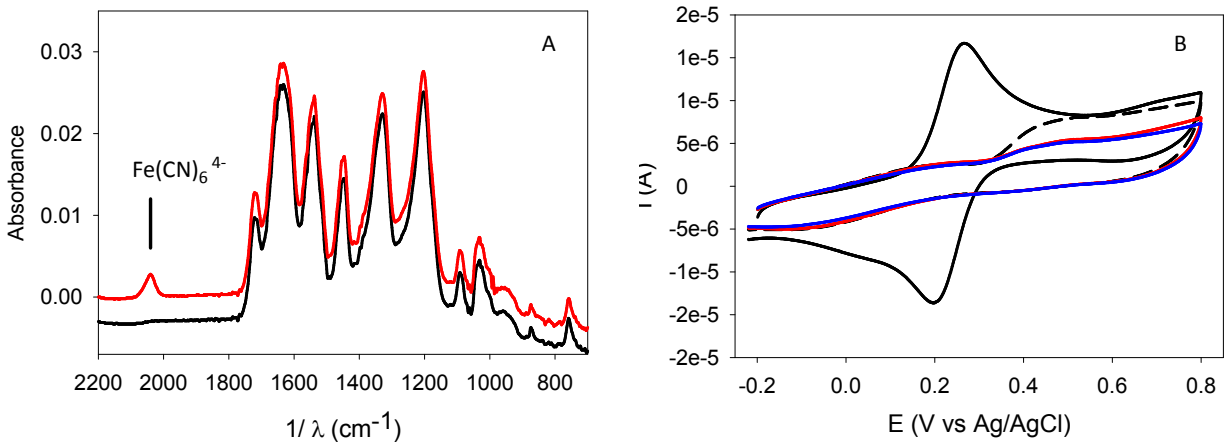

Fig. 8: A: FTIR-ATR spectra of a PEI-(gelatin-TA)$_5$-gelatin film (——) and of the same film put in presence of a 1 mM $K_4Fe(CN)_6$ solution in the presence of 50 mM sodium acetate + 150 mM NaCl buffer (total ionic strength: 182 mM) during 10 min before buffer rinse and spectral acquisition (——). For clarity the spectrum of the pristine film has been downshifted by 3 x 10^{-3} units.

B: CV experiment (scan rate of 100 mV.s^{-1}) of a PEI-(gelatin-TA)$_5$-gelatin film in contact with 50 mM sodium acetate + 150 mM NaCl buffer (– – –) and after exposure to the same buffer containing 1 mM $K_4Fe(CN)_6$ during 10 min (——) and 3 h (——). The CV of the pristine electrode in the presence of 1 mM $K_4Fe(CN)_6$ is also represented (——).