

Electronic Supplementary Information: Control of Magneto-Optical Properties of Co-Layers by Adsorption of α -Helical Polyalanine Self-Assembled Monolayers

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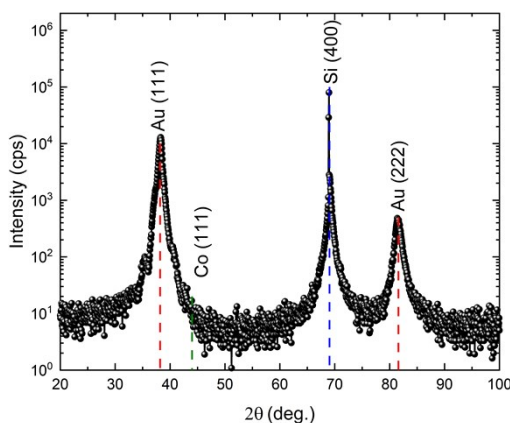


Figure S1. θ - 2θ scan recorded for the Si/SiO₂(100 nm)/Ta(2 nm)/Pt(5 nm)/Au(20 nm)/Co(1.1 nm)/Au(5 nm) layer stack. The observed reflexes are marked with respective elements and crystal orientation. The reflex around 38° is the cumulative response from Au (111) at 38.18° (bulk value), strained Pt (111) at 39.76° (bulk value), and strained Co (111) 44.21° (bulk value). The two shoulder peaks visible on either side of this peak are the interference oscillations due to the vertically coherent multi-layer structure with similar lattice spacings. The diffraction peak at 81.5° is attributed to the second-order diffraction of the Au (111), i.e. labelled as Au (222) reflex.

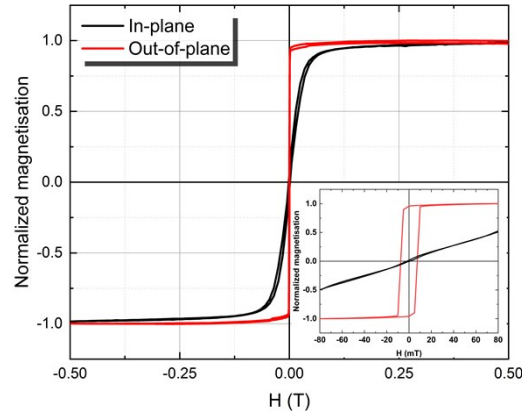


Figure S2. SQUID-VSM measured magnetisation loops for the layer stack Si/SiO₂(100 nm)/Ta(2 nm)/Pt(5 nm)/Au(20 nm)/Co(1.1 nm)/Au(5 nm), with the applied magnetic field in-plane (grey) and out-of-plane (red) geometry. The inset shows the close-up near magnetisation reversal.

The Cauchy dispersion layer is represented by the refractive index, which is mathematically described by an inverse power series of wavelength (λ) with only even terms, and by the extinction coefficient, which is described by an exponential function. These representations are as follows:

Cauchy layer details

$$n(\lambda) = A + \frac{B}{\lambda^2} + \frac{C}{\lambda^4}$$

$$k = k_{amp} e^{\exp(E - \text{band edge})}$$

The A, B, C parameters determine the refractive index dispersion. k_{amp} and \exp are parameters which determine the

line shape of the extinction coefficient dispersion. $E = h \frac{c}{\lambda}$ with h the Planck constant and c the light velocity. The *band edge* is the onset of absorption due to the bandgap and it is directly correlated to the k_{amp} parameter. [ref. 14 in the manuscript]. The values of the Cauchy parameters used in our study are listed below.

A = 1.45	B = 0.01 nm ⁻²	C = 0.00 nm ⁻⁴	$k_{amp} = 0.00$ (for $E < \text{band edge}$)
$\exp = 1.50$	<i>band edge</i> = 3.10 eV		

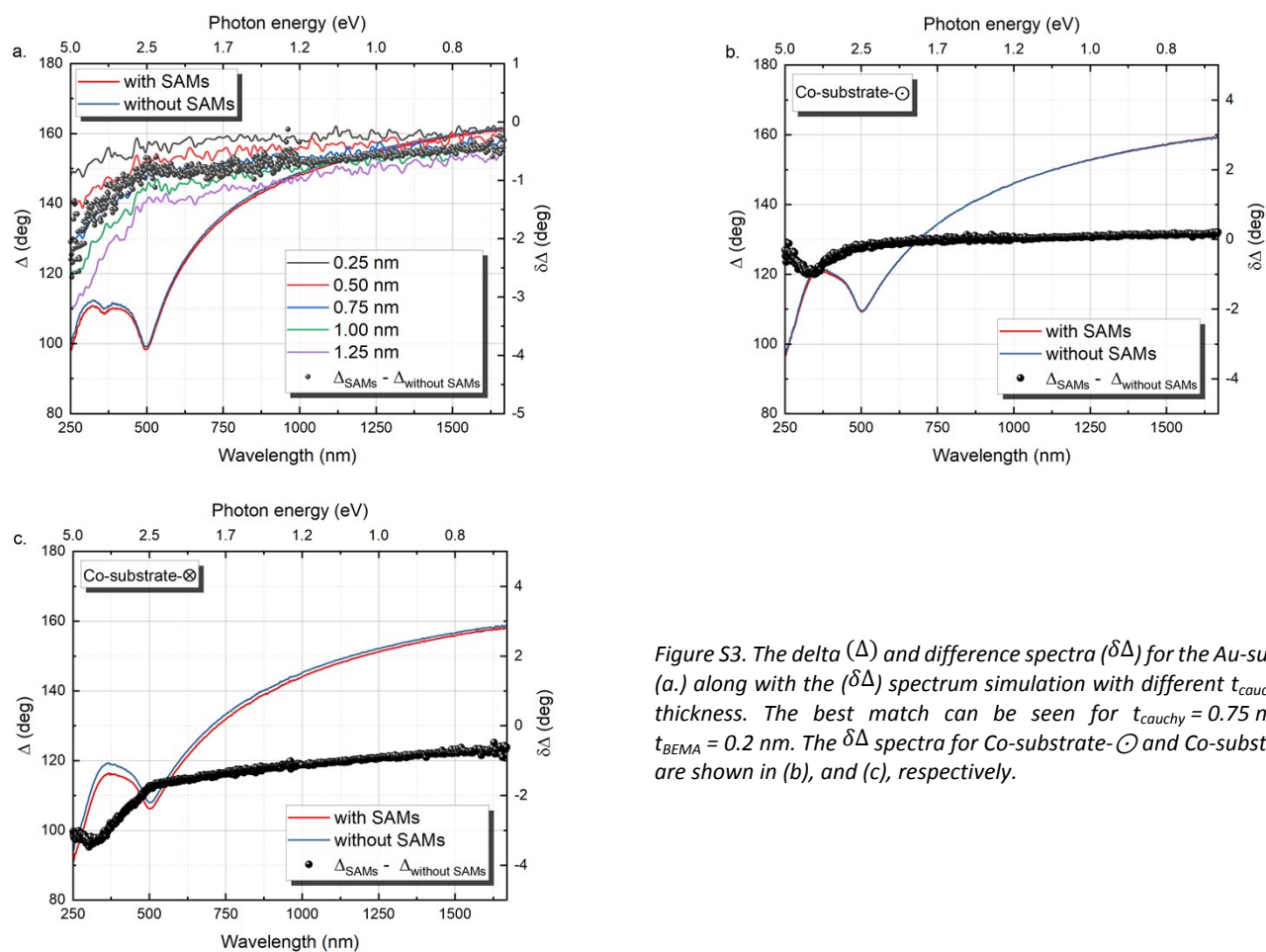


Figure S3. The delta (Δ) and difference spectra ($\delta\Delta$) for the Au-substrate (a.) along with the ($\delta\Delta$) spectrum simulation with different t_{cauchy} layer thickness. The best match can be seen for $t_{cauchy} = 0.75$ nm and $t_{BEMA} = 0.2$ nm. The $\delta\Delta$ spectra for Co-substrate-⊙ and Co-substrate-⊗ are shown in (b), and (c), respectively.

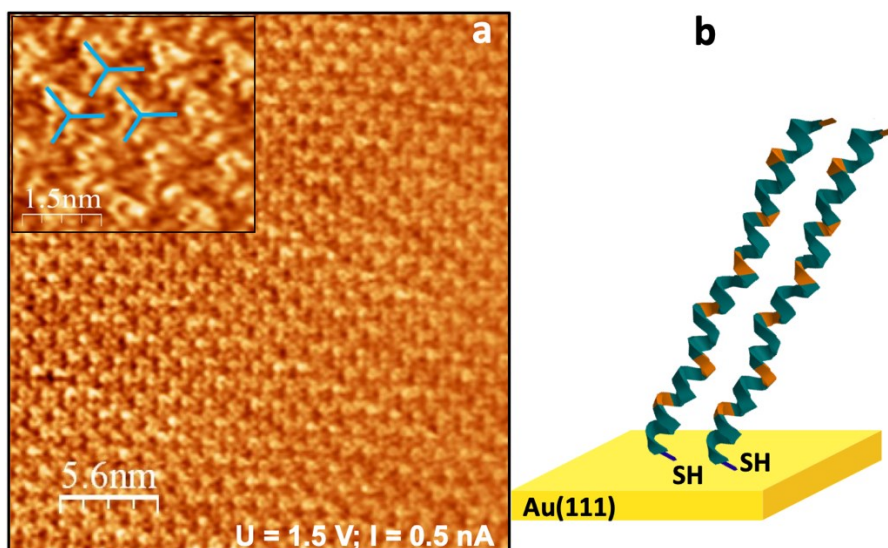


Figure S4. Scanning tunneling microscopy image (a) of deposition of 36-mer polyaniline (PA) molecules on Au(111) on mica substrate, results in highly ordered self-assembled PA chiral film. The interdigitation between adjacent molecules shown in the inset provides a high degree of rotational ordering where neighboring PA molecules (illustrated by the blue triplets) are intertwined; further details can be found in the ref. 20 of the manuscript. The PA molecules within the films are tilted by $\approx 50^\circ$ normal to the surface, as shown in the sketch (b), mainly due to the the Au-S bonding at the interface.