

Design and characterization of cellulose nanofibril-based free-standing films prepared by layer-by-layer deposition technique

Erdem Karabulut and Lars Wågberg*

Supplementary information

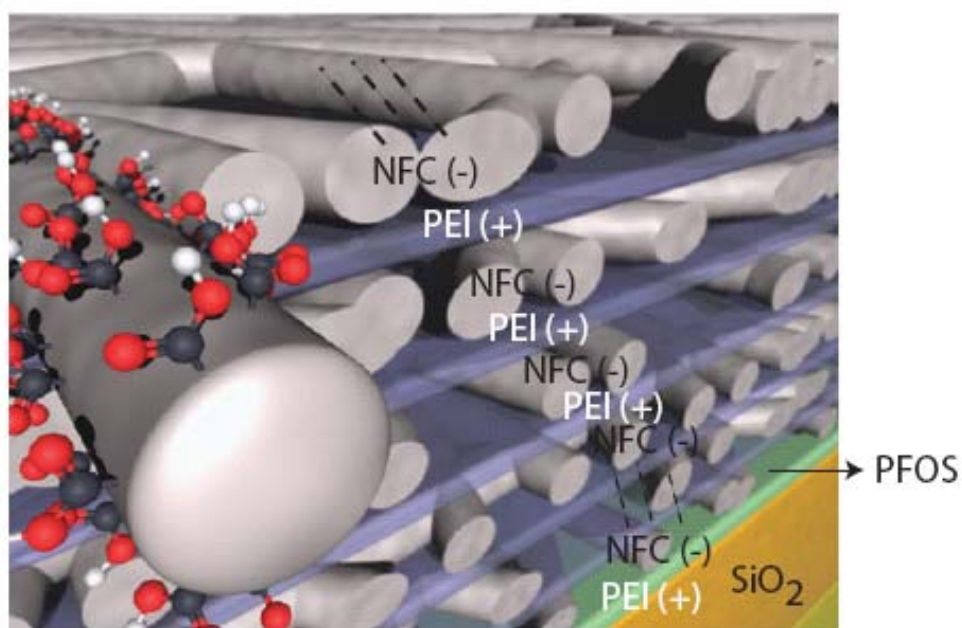


Figure S 1: Schematic illustration of a layer-by-layer film prepared from PEI and NFC. Ball-and-sticks seen on the nano-cellulose fibrils represent the carboxyl groups. Grey balls: (Carbon), red balls: (Oxygen) and white balls: (hydrogen).

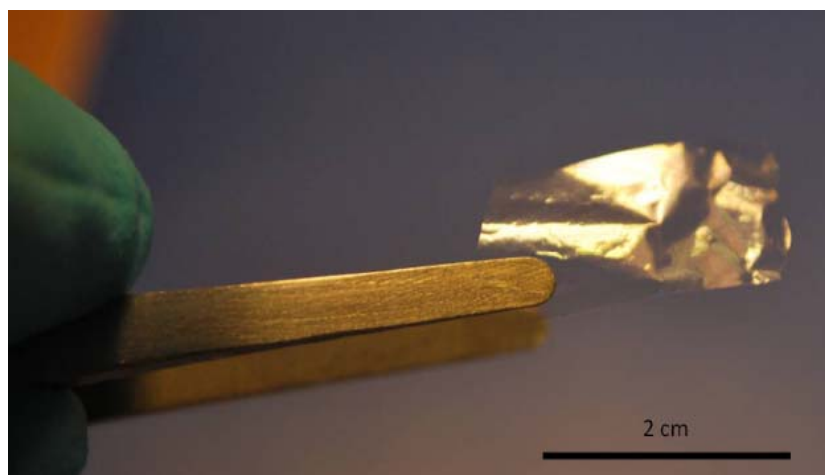


Figure S 2: A digital photograph of the $(\text{PEI/NFC})_{150}$ free-standing film. The thickness of $(\text{PEI/NFC})_{150}$ was measured to be about $5 \mu\text{m}$.

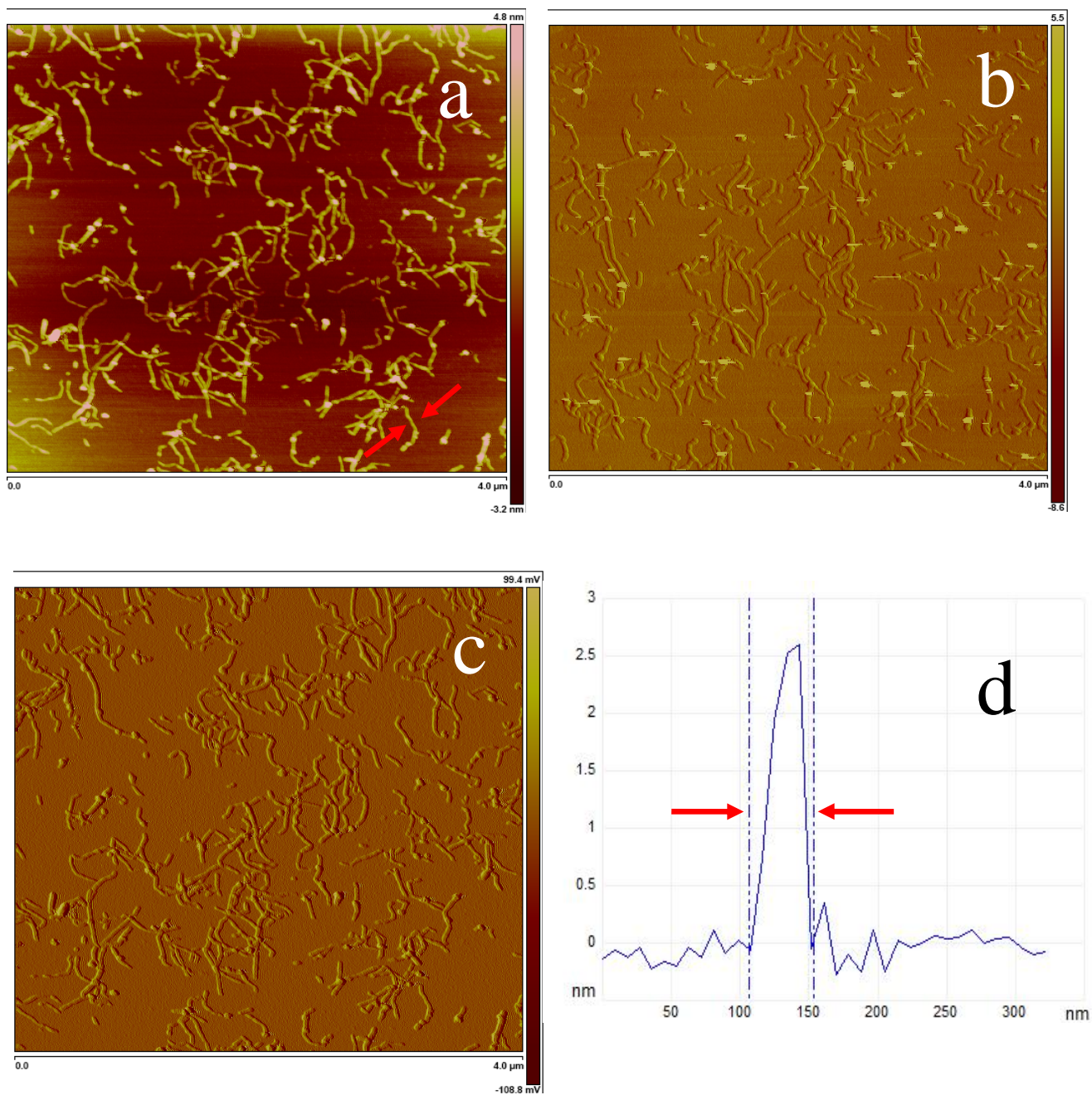


Figure S 3: AFM tapping-mode (a) height, (b) phase and (c) amplitude images of carboxymethylated cellulose nanofibrils (NFC) prepared on mica surface. Scanned surface area was $4 \times 4 \mu\text{m}^2$. (d) The diameter of one NFC fibril selected randomly on the height image (selected NFC fibril is shown between the red arrows.) The diameter of a single NFC fibril was found to be *ca.* 2.5 nm as estimated from the height measurement. Note that the fibrils appear wider as estimated from diameter measurements but this is due to tip broadening in the AFM measurements.