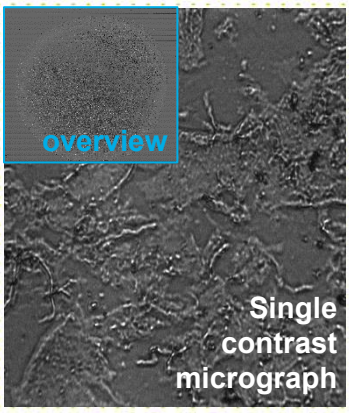
Extruded Collagen Fibres INVESTIGATED BY IMAGING ELLIPSOMETRY

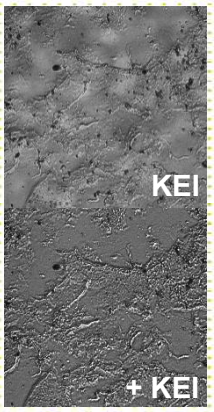
SAMPLE:

Manufacturing biocompatible surfaces has evolved into a cornerstone for downstream biomedical and pharmaceutical applications. In live tissues the structural and biochemical support for cells is maintained by various secreted extracellular matrix (ECM) components. The *ex vivo* deposition and network formation of these components on various scaffolds is crucial for subsequent cellular adhesion processes, thus vital for the production of tissue-like implants or effective cell-seeding on prostheses.
Here we focus on collagen, a highly abundant protein and key component of the ECM. The purified protein was extruded through a nanoporous filter, like dough in a pasta machine, and deposited as a drop onto a conventional glass microscope slide[1]. The sample was a kind gift from the Emmy Noether research group for nanoBiomaterials of Prof. Dorothea Brüggemann[2] (preparation by M.Sc. Karsten Stapelfeldt).

SETUP MEASUREMENT:

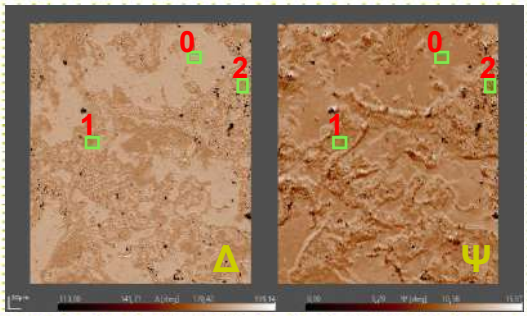


We used imaging ellipsometry with the **nanofilm_EP4** for the analysis of the extruded collagen fibres. A total sample overview covering 2.7 cm^2 was generated by the integrated image stiching algorithm combining 1008 single contrast micrographs into one image (left). Backside reflections of the glass slide are suppressed using the unique knife-edge illumination feature (KEI, right). Subsequently regions of interest were selected upon this pre-screening and Δ/Ψ maps were recorded spectroscopically from 400 to 760 nm (below).

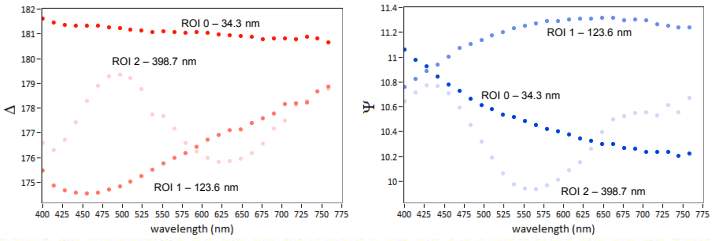


RESULTS:

Δ and Ψ map @ 400nm



Spectroscopic data evaluation of specific regions of interest



Microscopic evaluation of extruded fibres (contact-free)
Spectroscopic Δ, Ψ values/maps and ROI evaluation
Thickness analysis of the collagen network

1. Raoufi, M. *et al.* Template-assisted extrusion of biopolymer nanofibers under physiological conditions. *Integr Biol (Camb)* **8,** 1059–1066 (2016).
2. Emmy Noether research group for nanoBiomaterials – Institute for Biophysics (FB1) – University of Bremen – www.biophysik.uni-bremen.de/start/brueggemann-group

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