

Supplementary Material: Enhanced piezoelectricity and self-assembly of collagen bundles induced by chemical crosslinking

July 3, 2019

1 Atomic Force Microscopy

1.1 Quantitative Nanomechanical Mapping

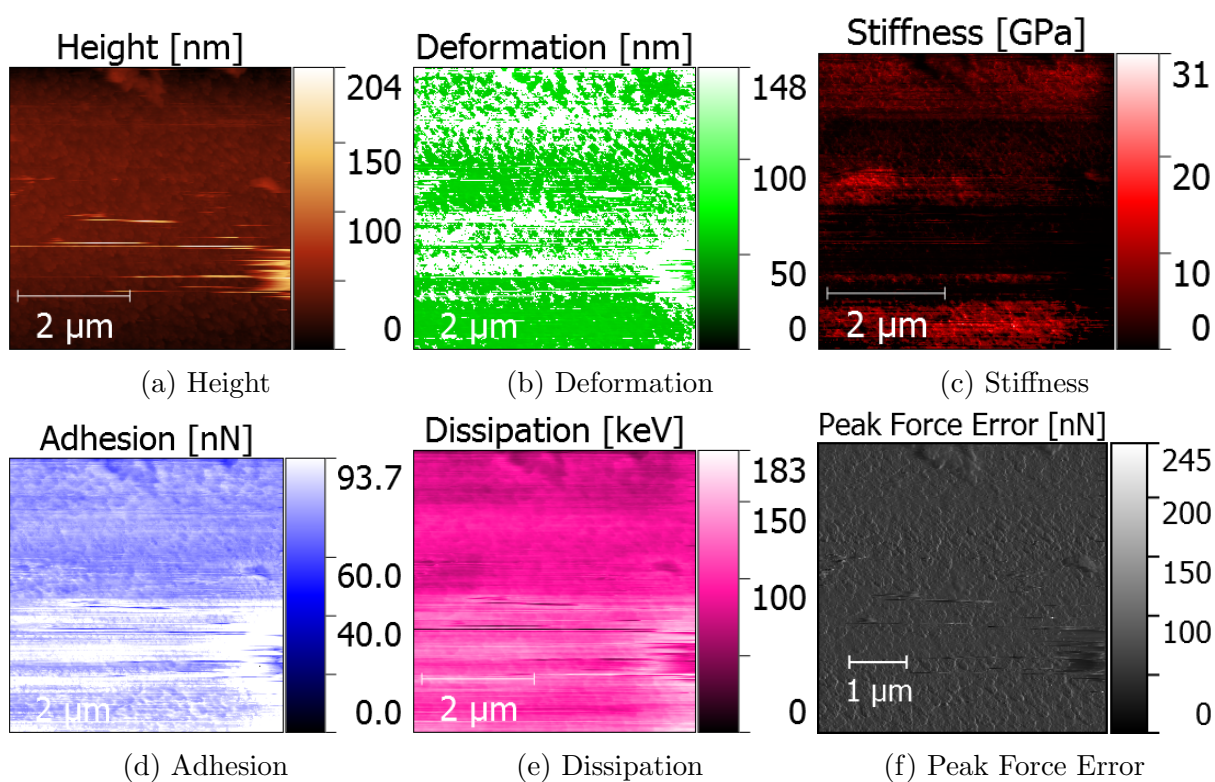


Figure 1: QNM Channels: ITO coated glass

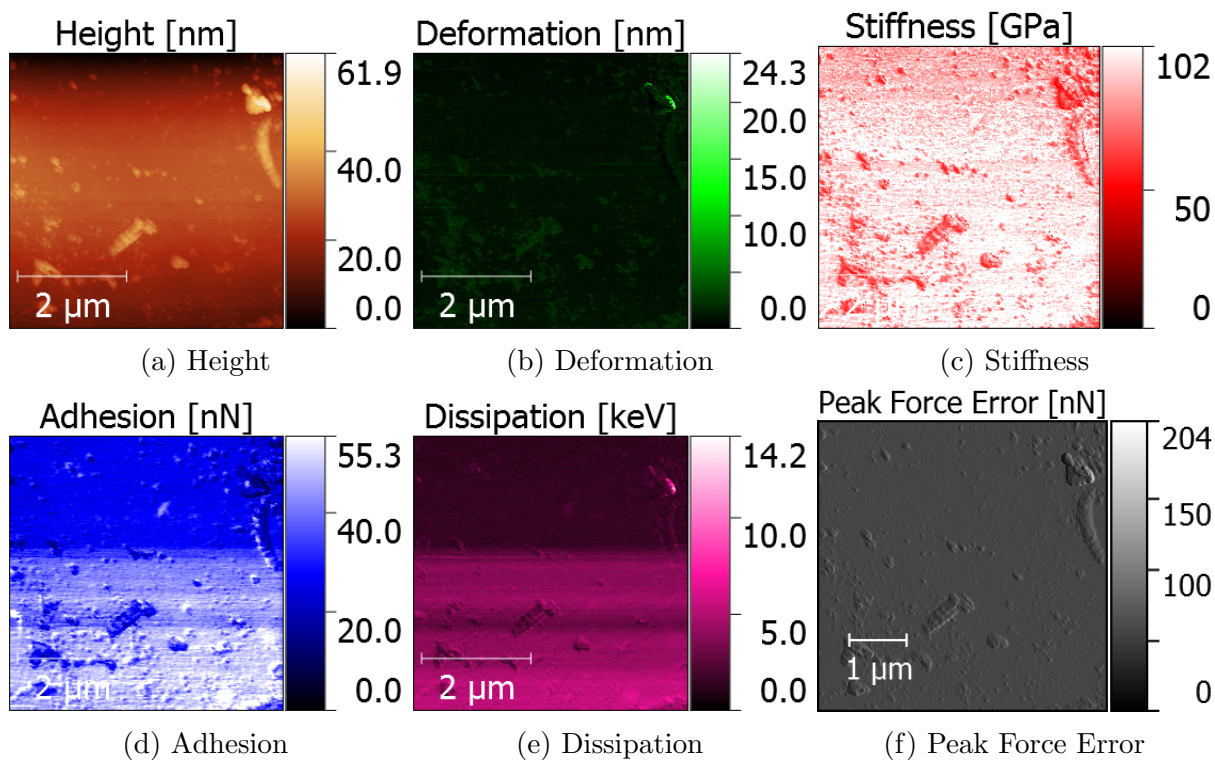


Figure 2: QNM Channels: Borosilicate glass

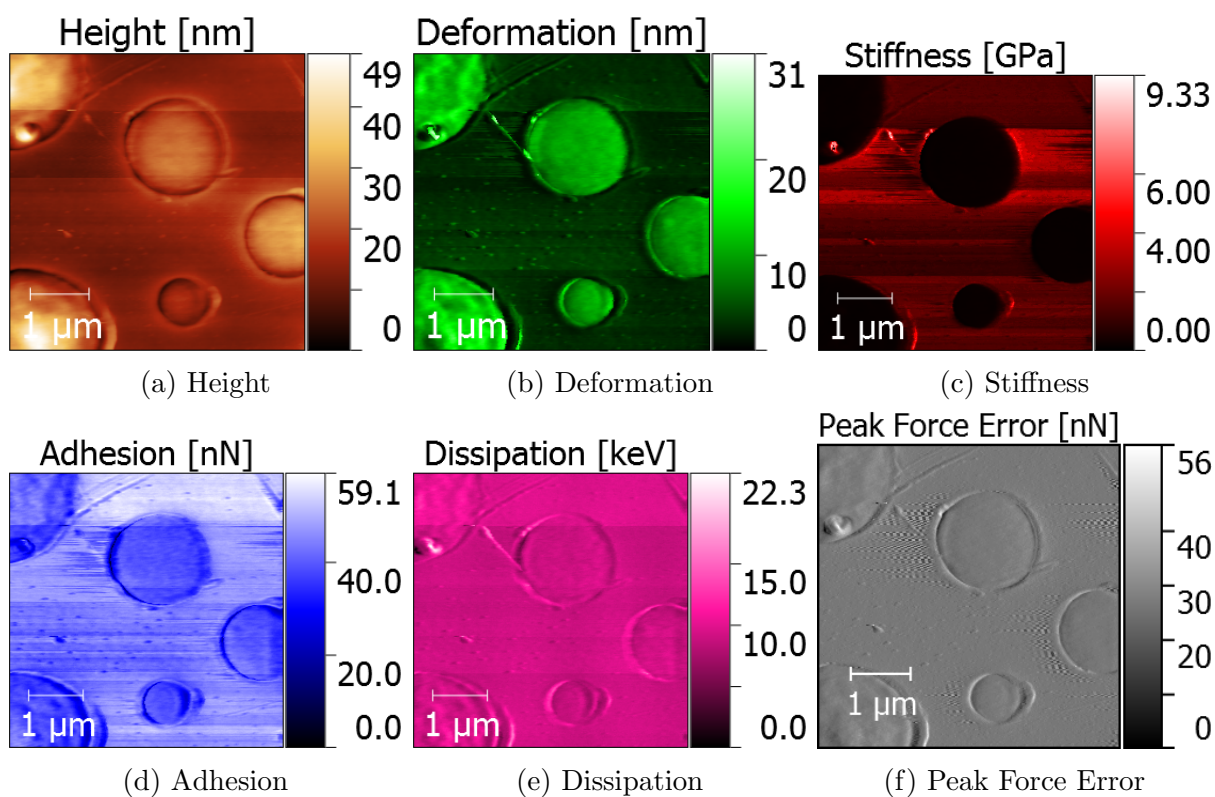


Figure 3: QNM Channels: PS-LDPE Calibration Samples

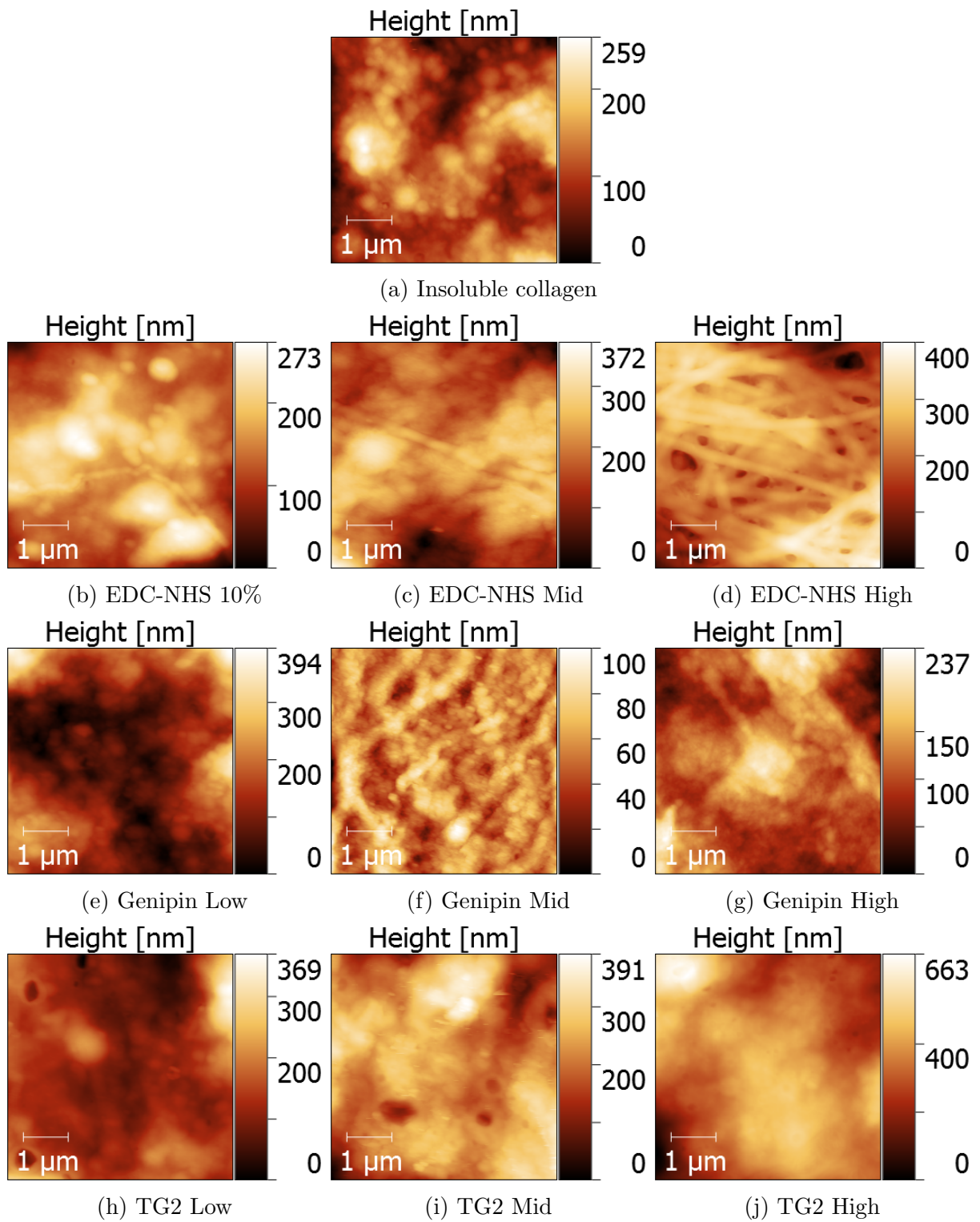


Figure 4: QNM Height Channel

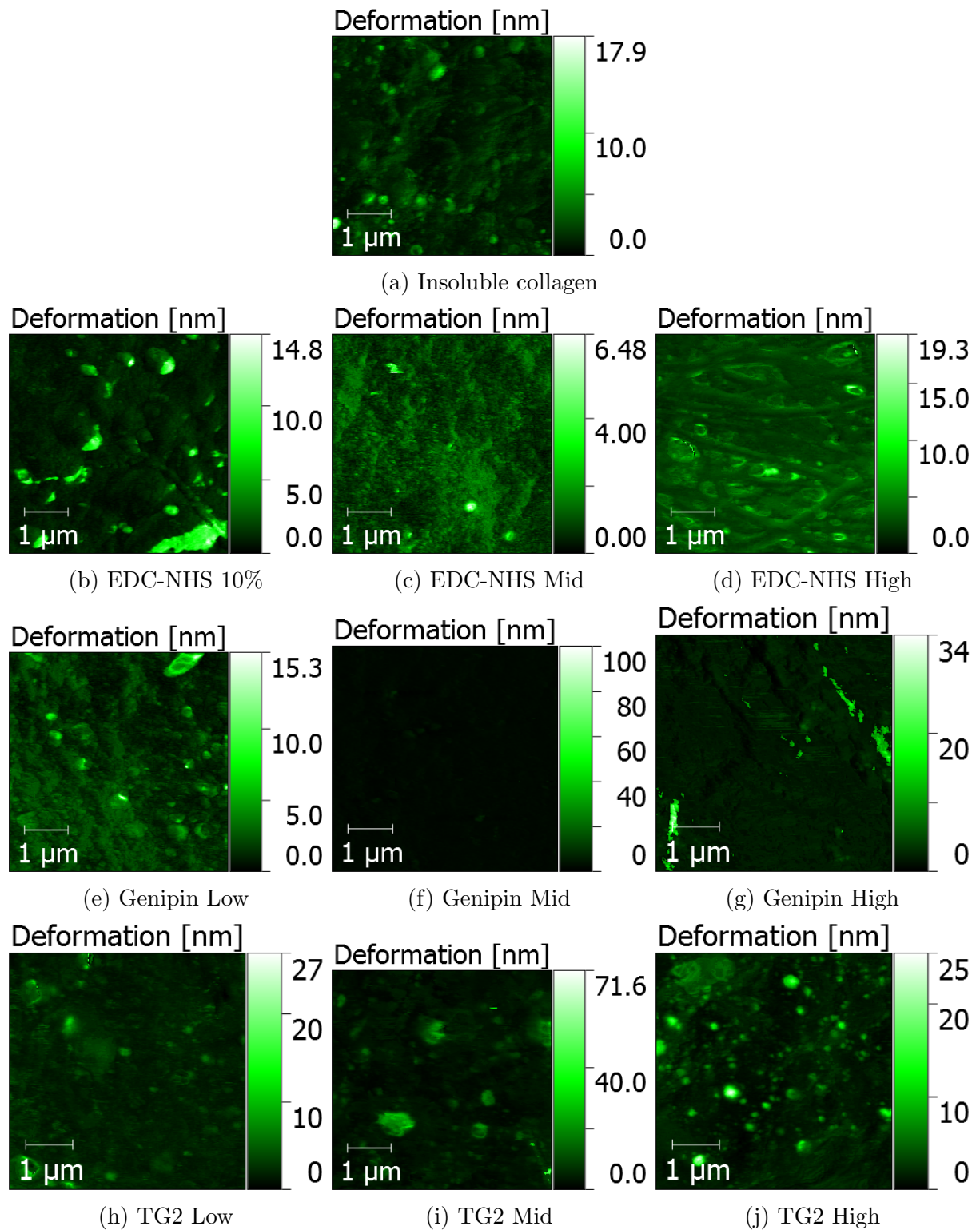


Figure 5: QNM Deformation Channel

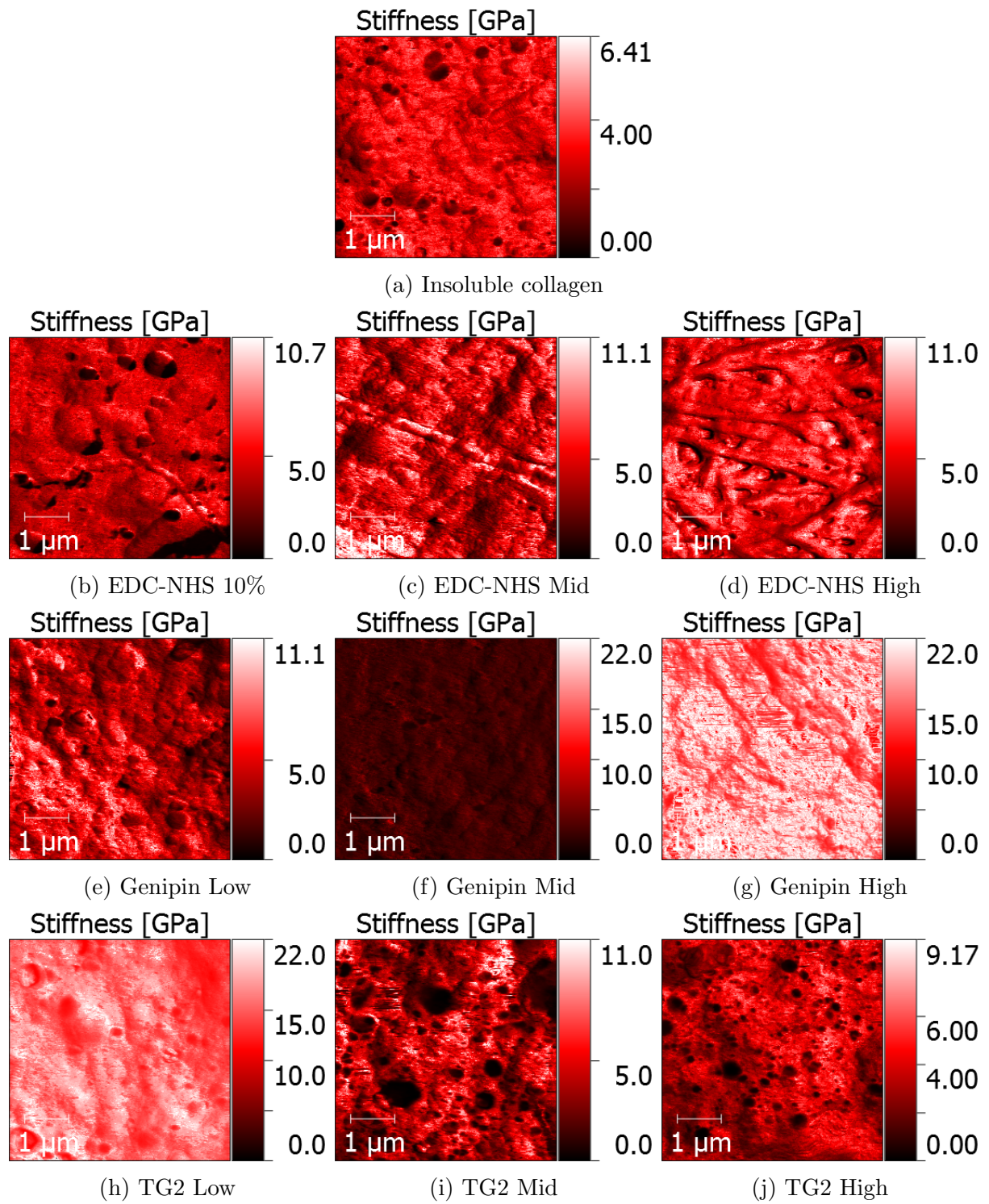


Figure 6: QNM Stiffness Channel

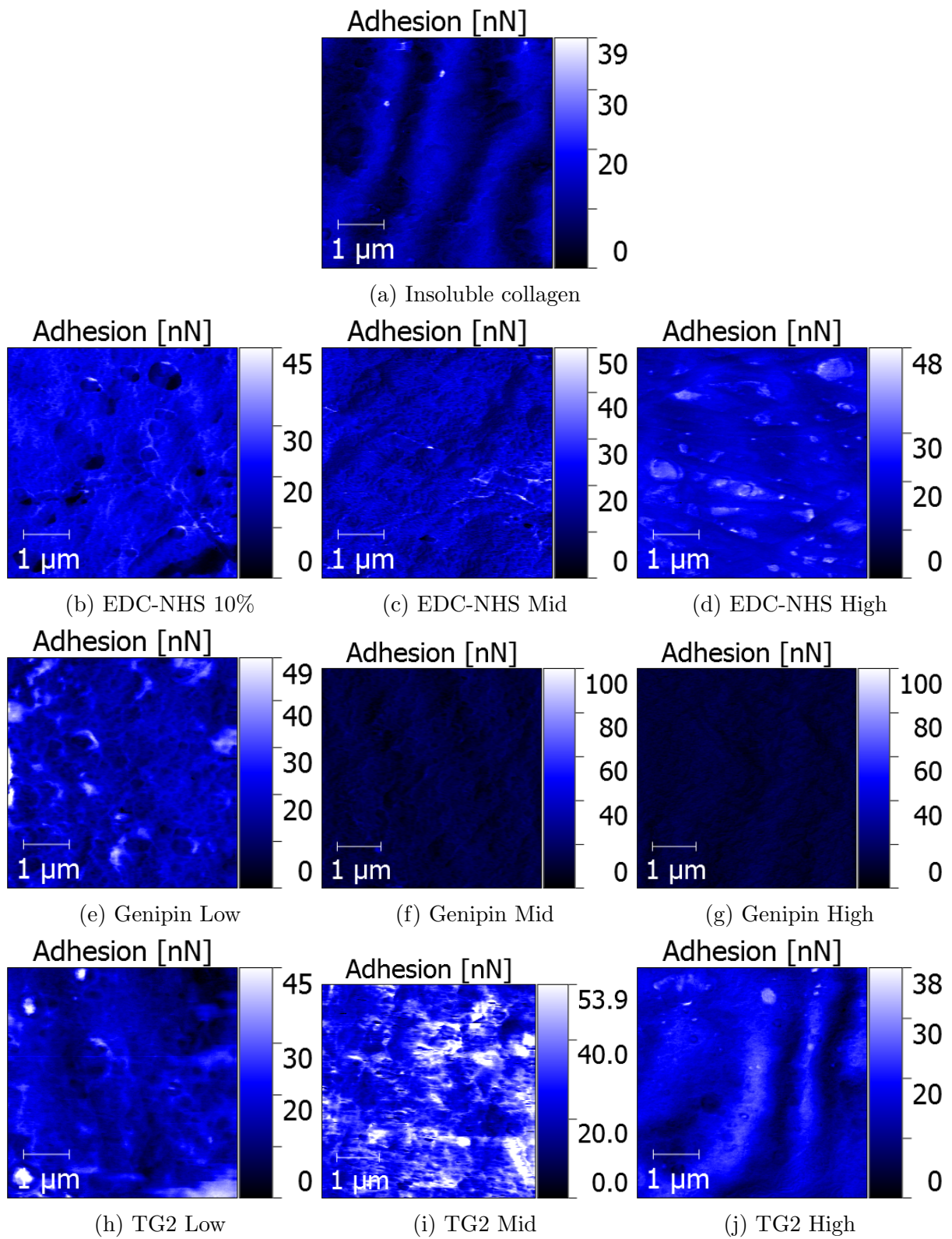


Figure 7: QNM Adhesion Channel

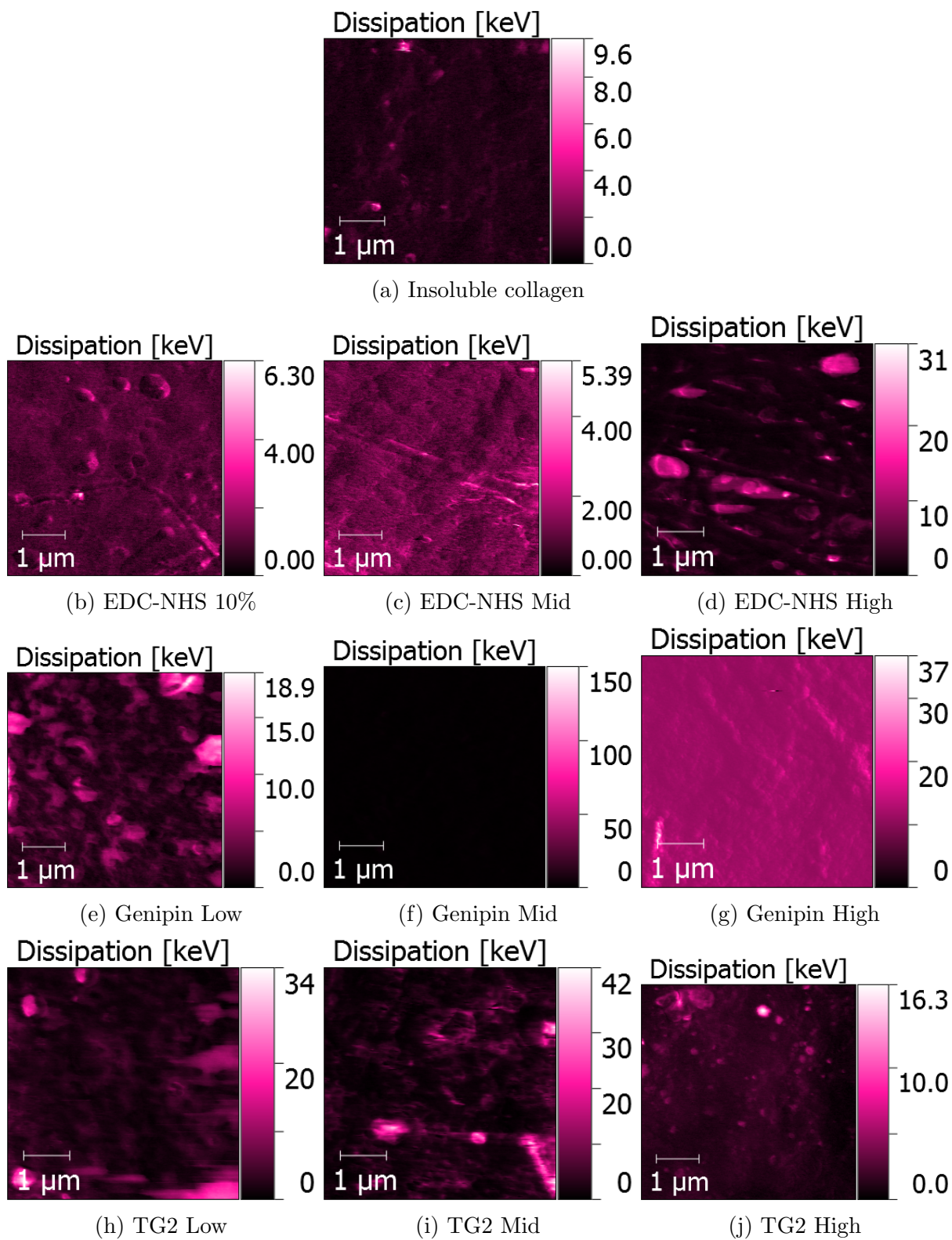


Figure 8: QNM Dissipation Channel

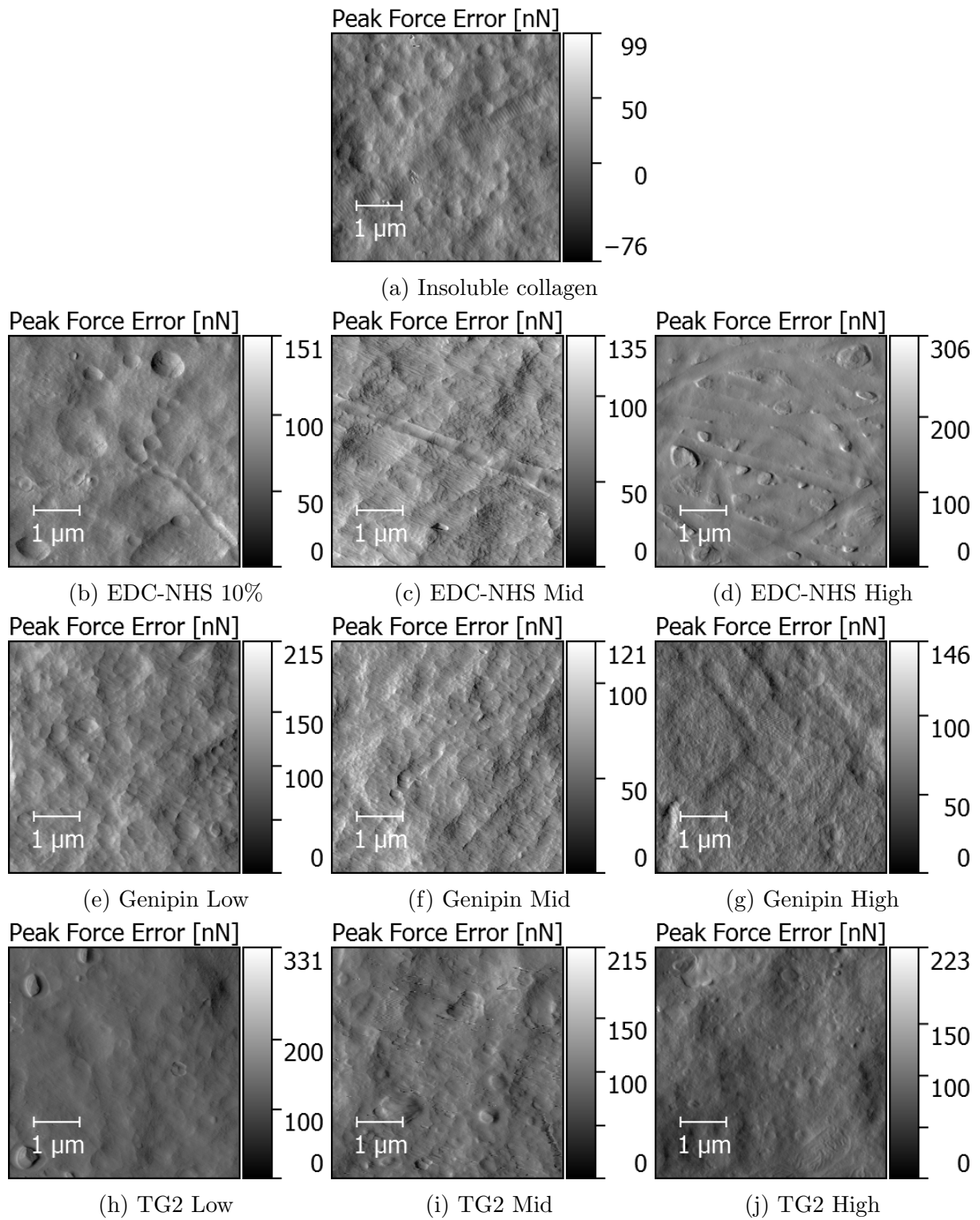


Figure 9: QNM Peak Force Error Channel

1.2 Kelvin Probe Force Microscopy

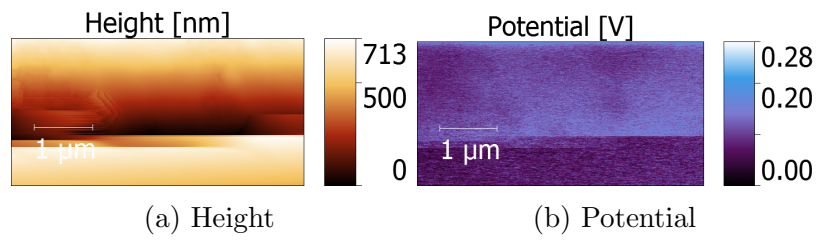


Figure 10: KPFM Control: ITO coated glass

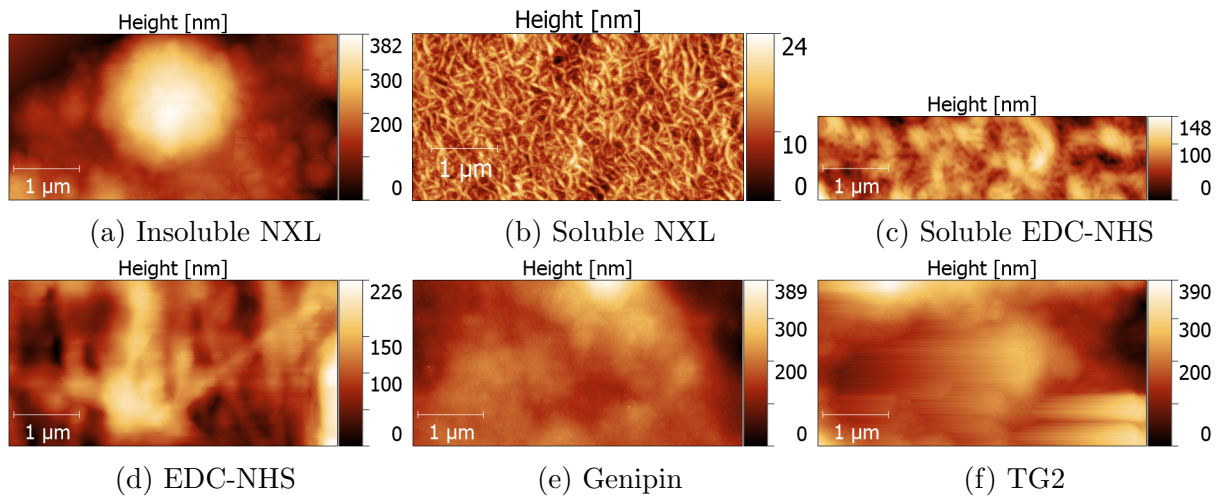


Figure 11: KPFM Height Channel

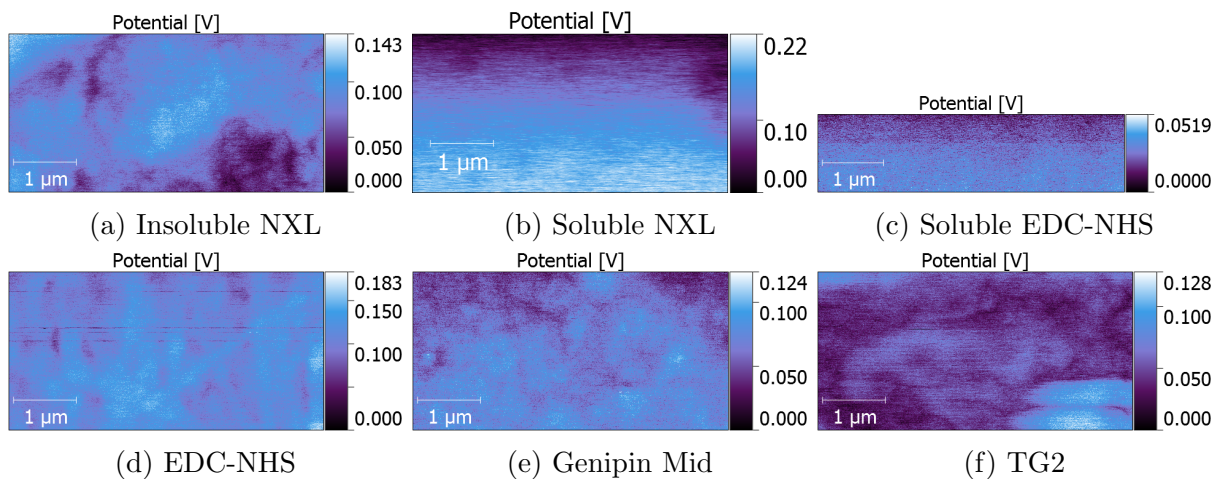


Figure 12: KPFM Potential Channel

1.3 Piezoresponse Force Microscopy

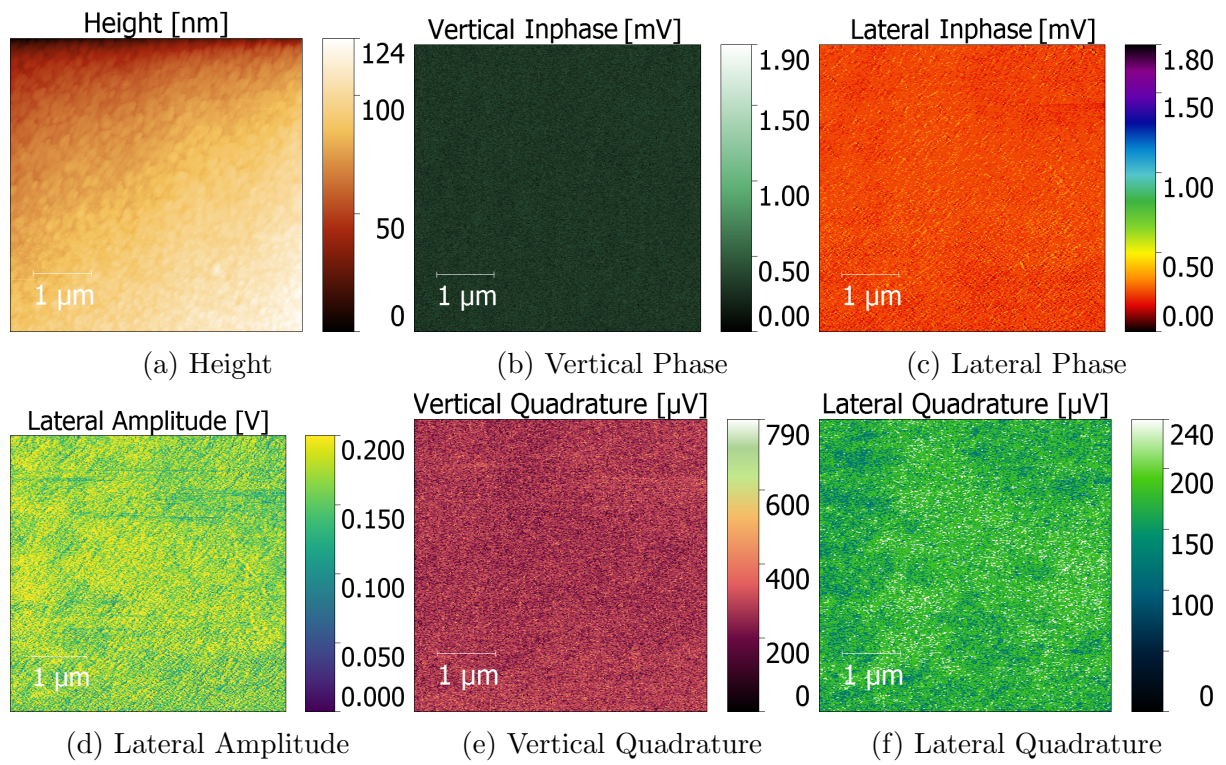


Figure 13: PFM Channels: ITO Coated Glass

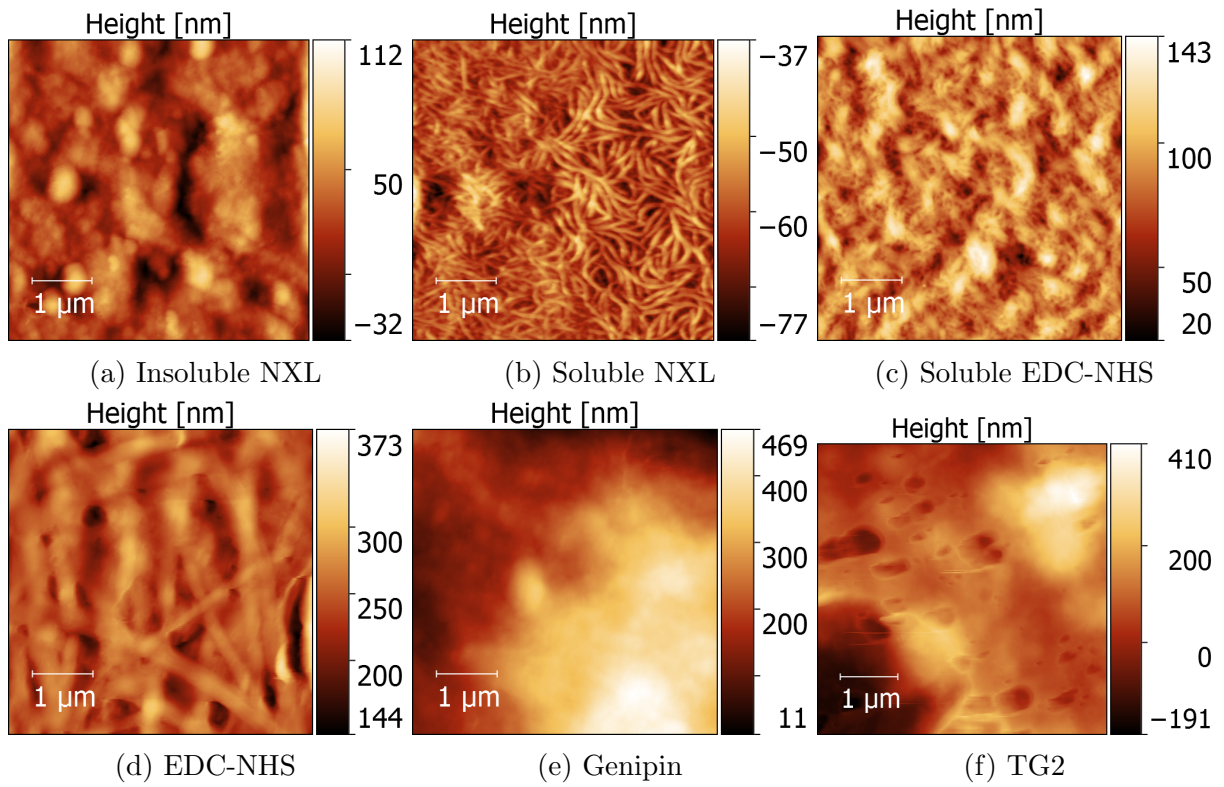


Figure 14: PFM Height Channel

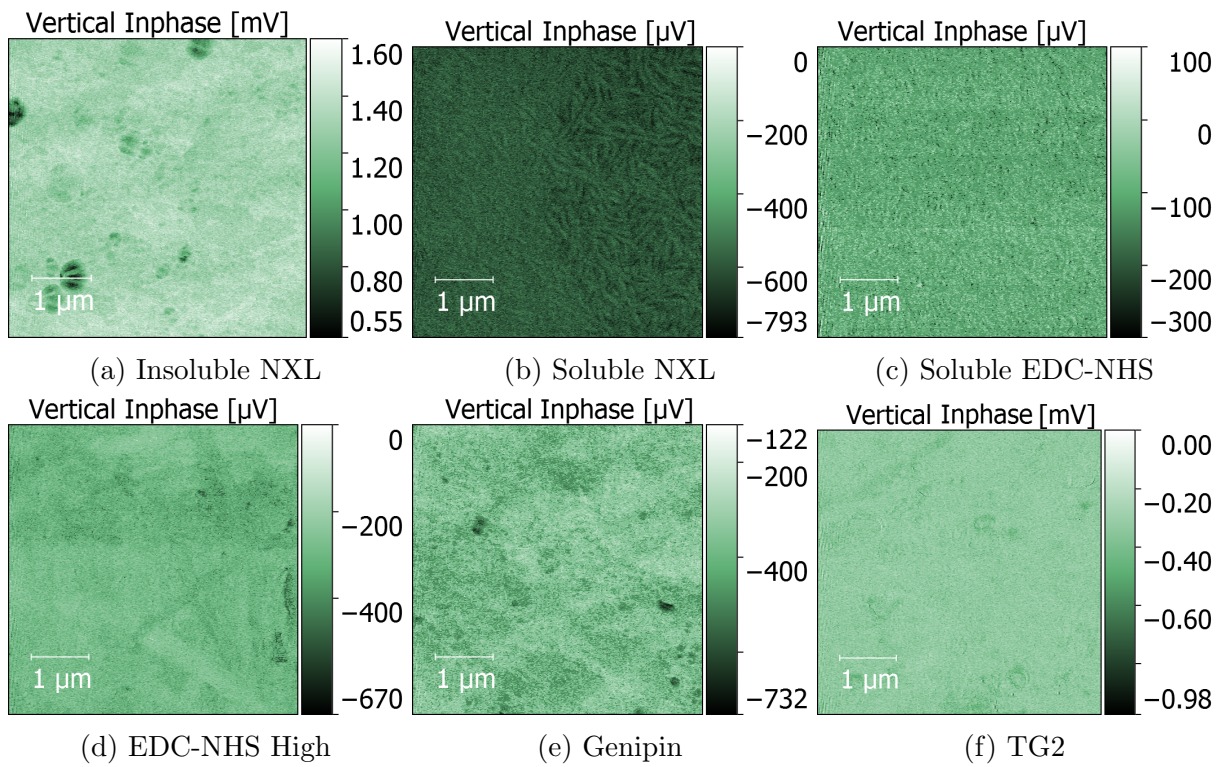


Figure 15: PFM Vertical Phase Channel

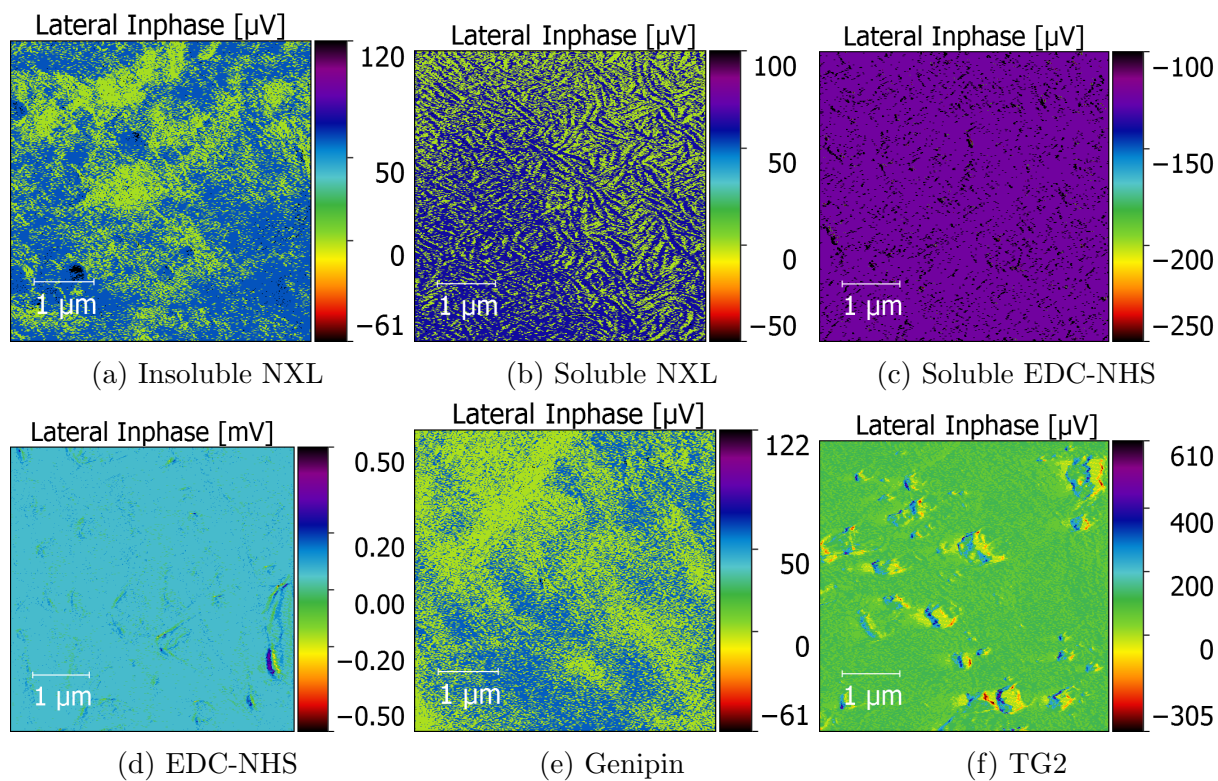


Figure 16: PFM Lateral Phase Channel

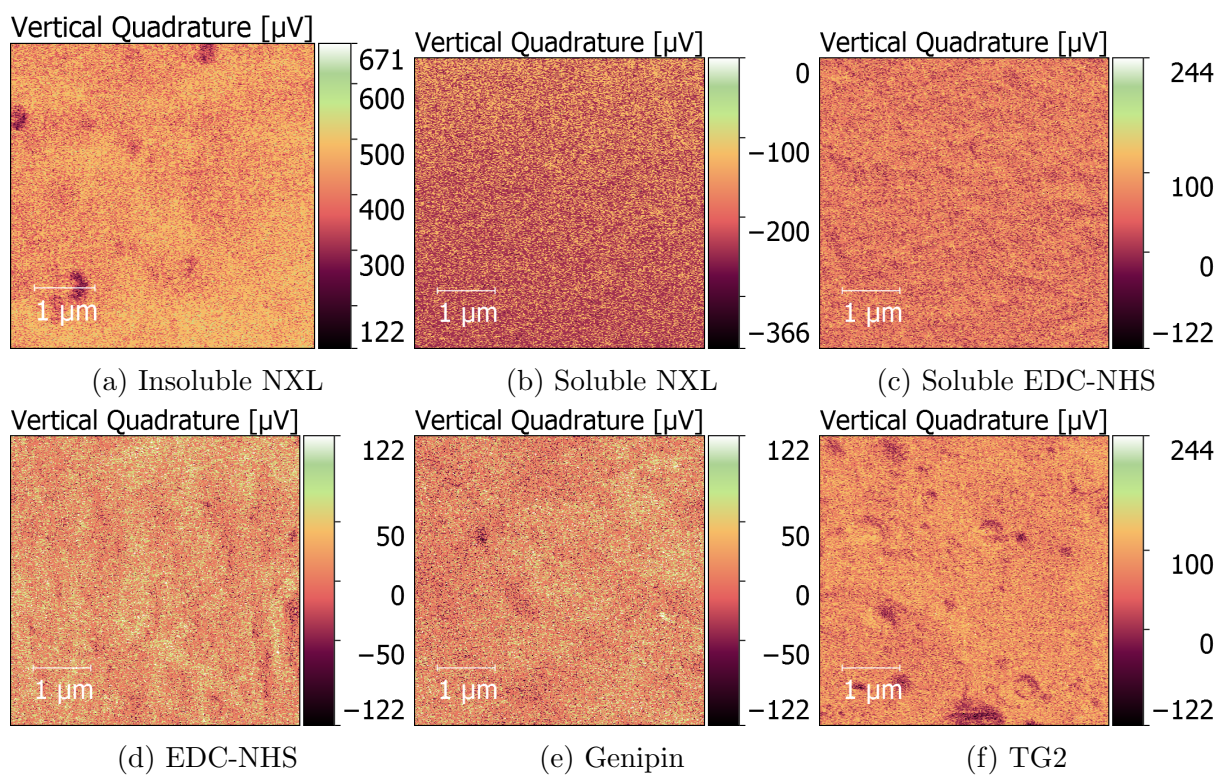


Figure 17: PFM Vertical Quadrature Channel

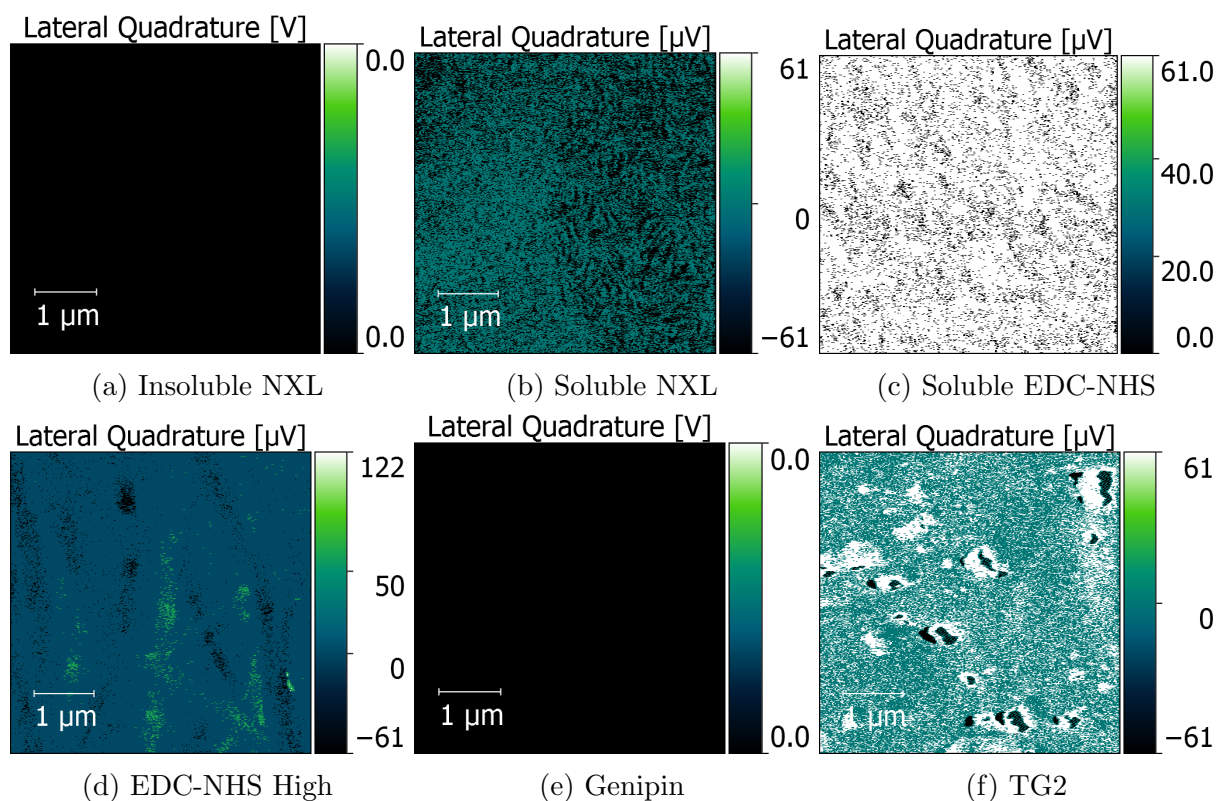


Figure 18: PFM Lateral Quadrature Channel

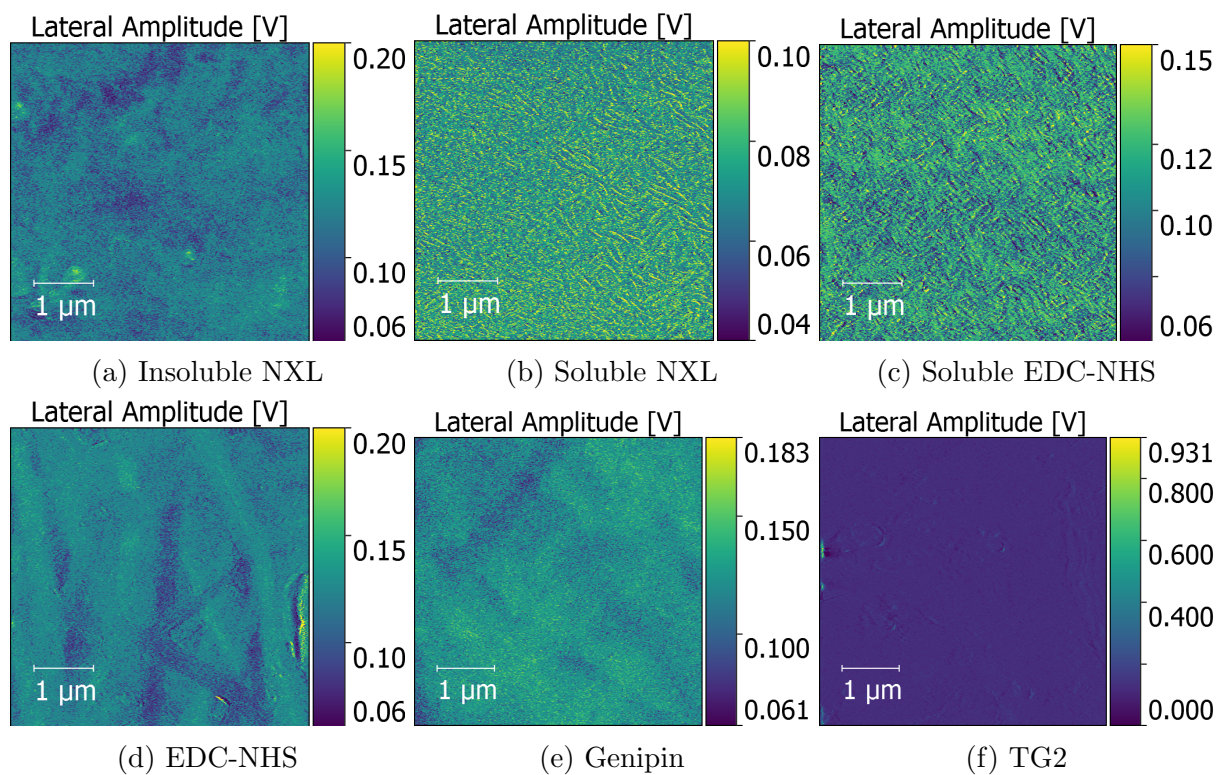


Figure 19: PFM Lateral Amplitude Channel

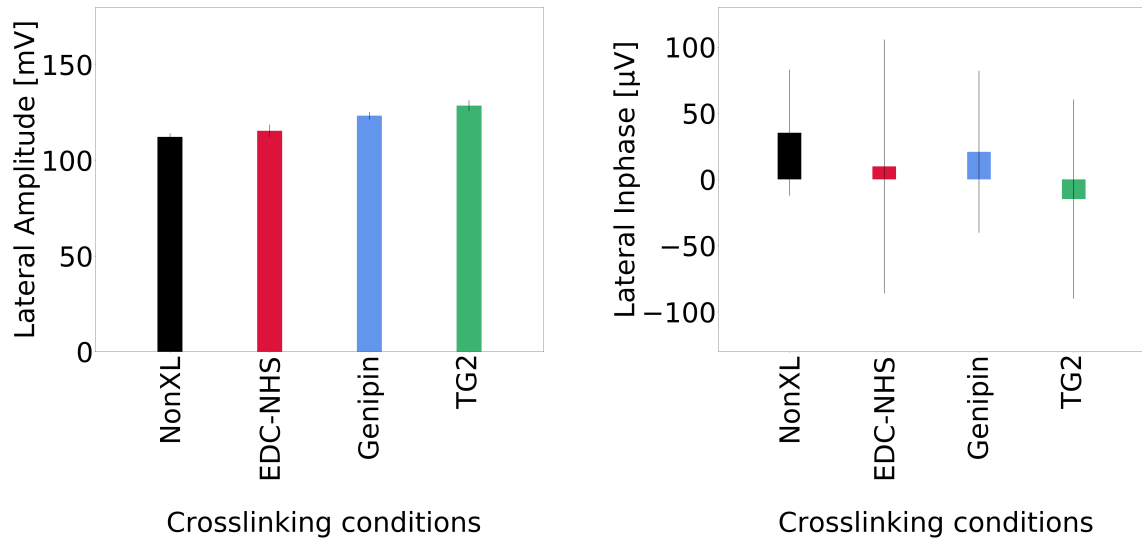


Figure 20: Numerical averages of lateral inphase and amplitude channels

2 Profilometry

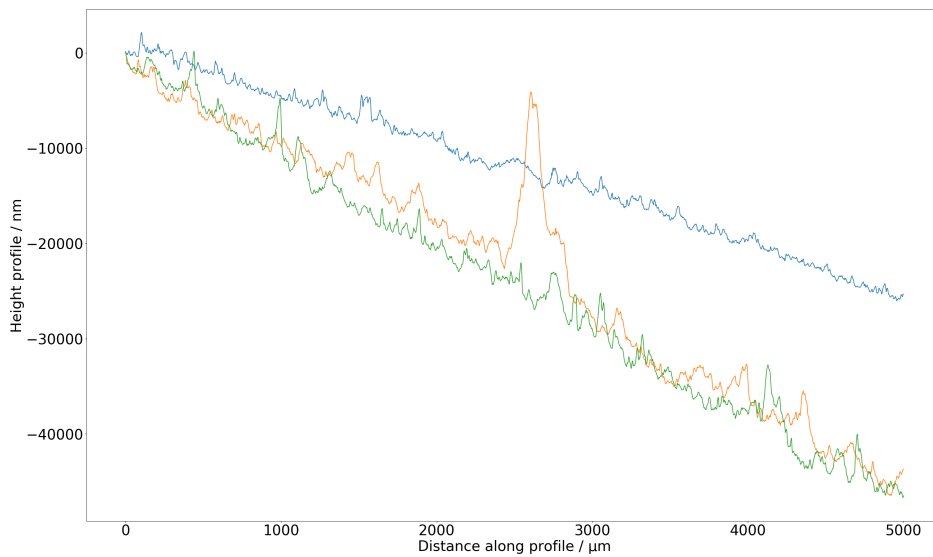


Figure 21: Height profile against three representative samples of cast collagen samples, showing large variations in thickness across the sample.