Figure S1: NIR spectra of the combination water band at ~5180 cm⁻¹ for C₈PO with variable water contents 100, 90, 80.1, 60.5, 40 and 23.5 wt/wt% (top to bottom) performed at room temperature.
Figure S2: Representative calibration curve for DIT_NIR Microspectroscopy performed at 20°C using octyldimethylphosphine oxide ($C_8$PO). The calibration curves are linear with concentration demonstrating a Beer-Law dependency.
Figure S3: Validation of the DIT-NIR microspectroscopy method using C_{12}EO_8 a) penetration scan (non-cross polarised x100) showing the progression of phases at 20°C. The arrows indicated boundaries of bands with refractive index difference. b) NIR bend-stretch combination band at 5200 cm\(^{-1}\) showing the decrease in water signal from left to right across the phase boundaries. c) phase diagram of C_{12}EO_8 [re-drawn from Mitchell et. al\{Mitchell, Tiddy, et al. 1983 #290\}] with overlay of data collected from DIT-NIR showing reasonable correspondence.