Supplementary Materials

Supplementary Figure 1: Raman spectra of calcium fluoride slides, examined as-received.

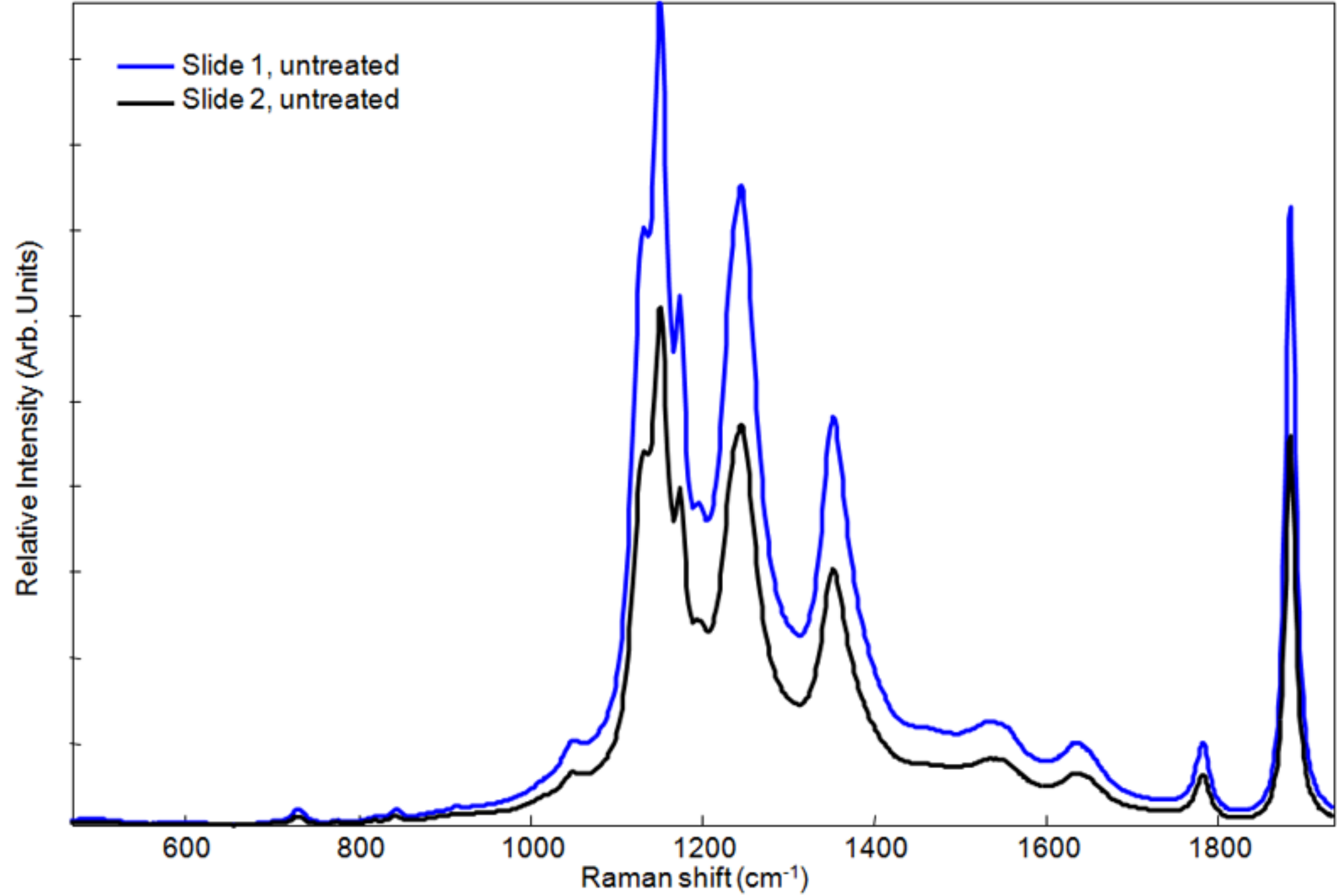
Supplementary Figure 2: Geometric properties of drying DJC synovial fluid drops.

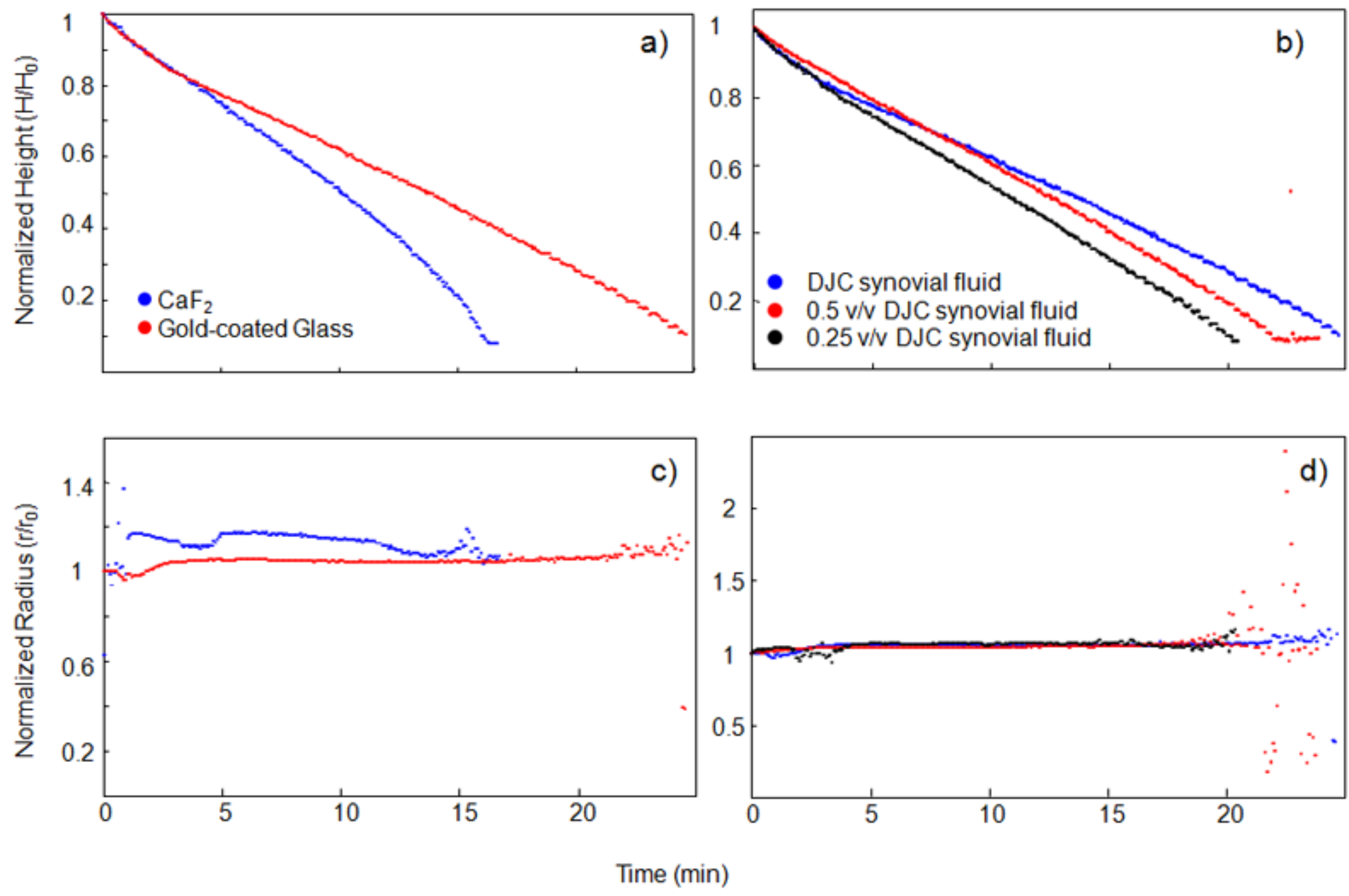
Supplementary Figure 3: Low magnification images of dried normal synovial fluid drops as a function of concentration and wetting properties. Upper row: CaF_2, Lower row: gold-coated glass.

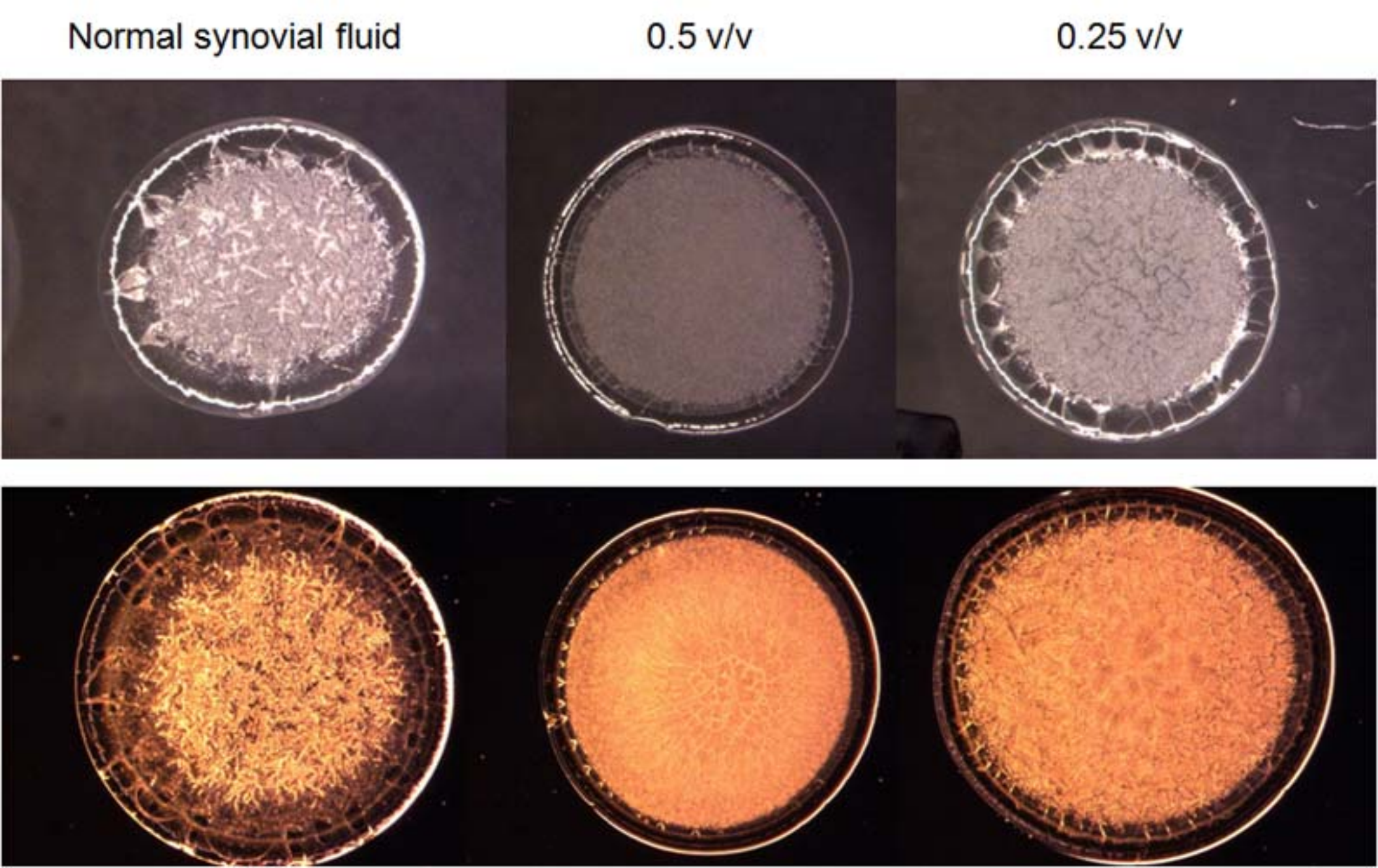
Supplementary Figure 4: Low magnification images of dried DJC synovial fluid drops as a function of concentration and wetting properties. Upper row: CaF_2, Lower row: gold-coated glass.

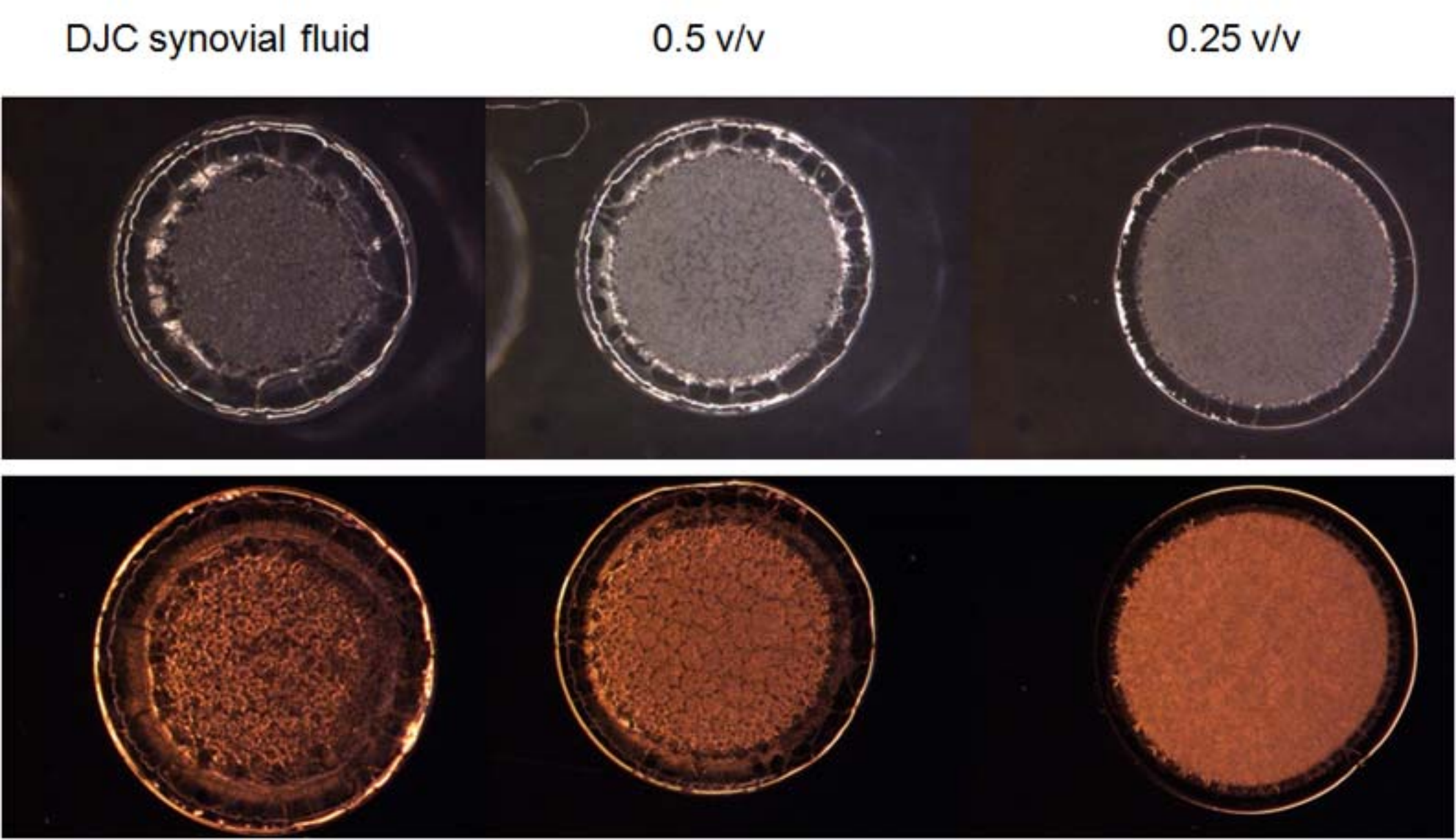
Supplementary Figure 5: Raman spectra of synovial fluid collected at various points along a synovial fluid drop. The depicted synovial fluid is from an individual patient and stored in a specimen vial enriched with proteases and anti-coagulants. The presence of the proteases and anti-coagulants prohibited good classification of bulk fluid tests, such as viscosity. The impurities, whose presence was indicated by the marked bands (*) in the bottom spectrum, were easily separated by the drop deposition process and enabled Raman classification of synovial fluid from each patient.

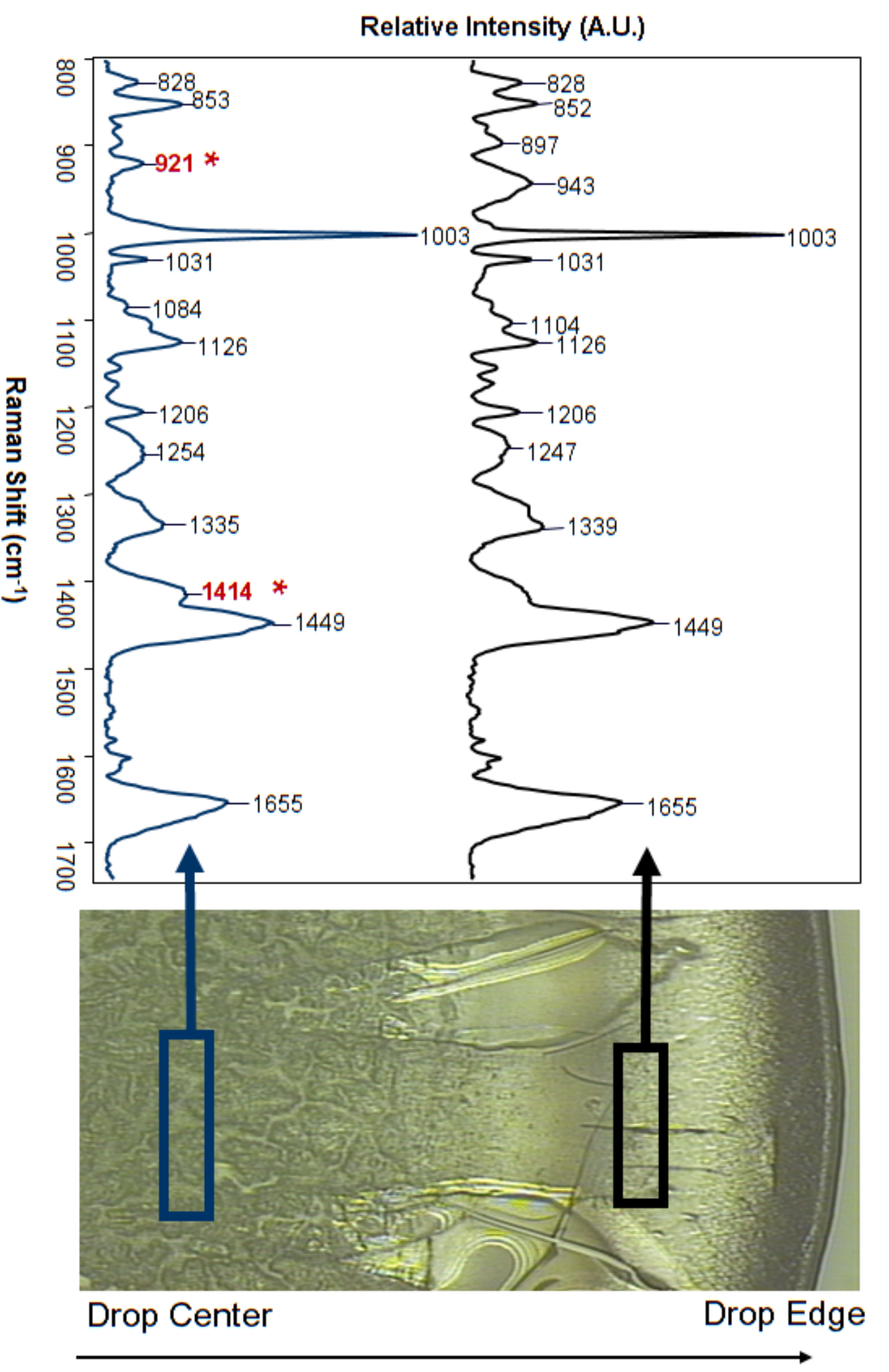
Supplementary Videos: Videos 1-3 show a time-course of synovial fluid (normal and DJC) and plasma drying on gold-coated glass. A side-profile and overhead image was collected every second and compiled into a video. The side profile images show that the contact line remains pinned. Overhead images capture the formation of radial cracks and fern-shaped crystals. For reference, Video 4 compares the drying behavior of plasma with water.


Slide 1, untreated
Slide 2, untreated
Relative Intensity (Arb. Units)
600
800
1000
1200
1400
1600
1800
Raman shift (cm-1)


a)
b)
c)
d)
Normalized Height (H/H0)
Normalized Radius (r/r0)
Time (min)
CaF2
Gold-coated Glass
DJC synovial fluid
0.5 v/v DJC synovial fluid
0.25 v/v DJC synovial fluid


Normal synovial fluid
0.5 v/v
0.25 v/v


DJC synovial fluid
0.5 v/v
0.25 v/v


Relative Intensity (A.U.)
Raman Shift (cm-1)
800
900
1000
1100
1200
1300
1400
1500
1600
1700
828
853
921 *
1003
1031
1084
1126
1206
1254
1335
1414 *
1449
1655
828
852
897
943
1003
1031
1104
1126
1206
1247
1339
1449
1655
Drop Center
Drop Edge