Identification of volatile organic liquids by combining an array of fiber-optic sensors and machine learning.

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Supporting Figures

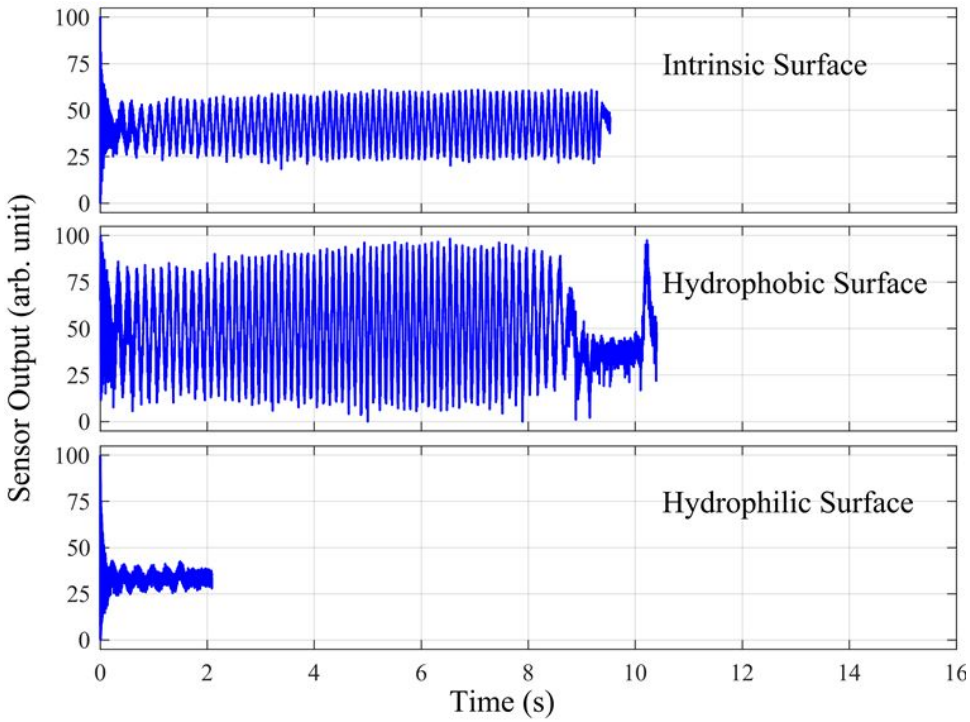

Figure S1. An example of time-domain evaporation transient response signals for evaporating droplets of **decane** using an array of three fiber-optic sensors. Each signal corresponds to an evaporation event of a single **decane** droplet from a single surface in the

array of sensor. For comparison, the x-axis is set to a range of 0 to 16 seconds for all evaporation transients, so that response signals of varying durations can be compared.

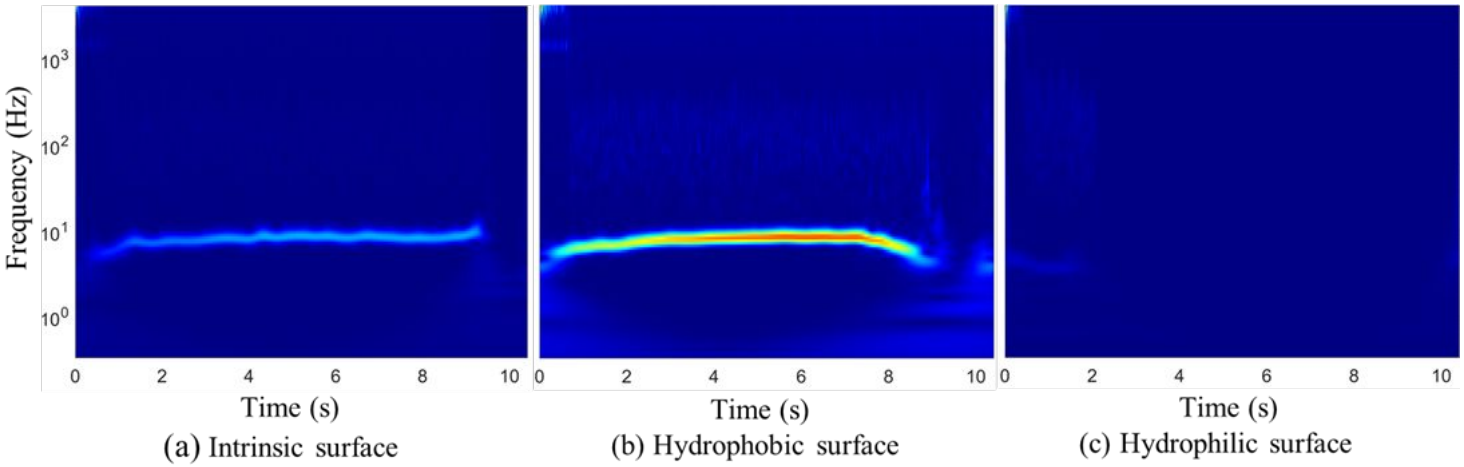

Figure S2. Comparison of the scalograms for the evaporation events for **decane** from the "three-dip" test. Response signals from **decane** droplet evaporation on (a) the intrinsic surface, (b) the hydrophobic surface, and (c) the hydrophilic surface for the "three-dip" test are shown.

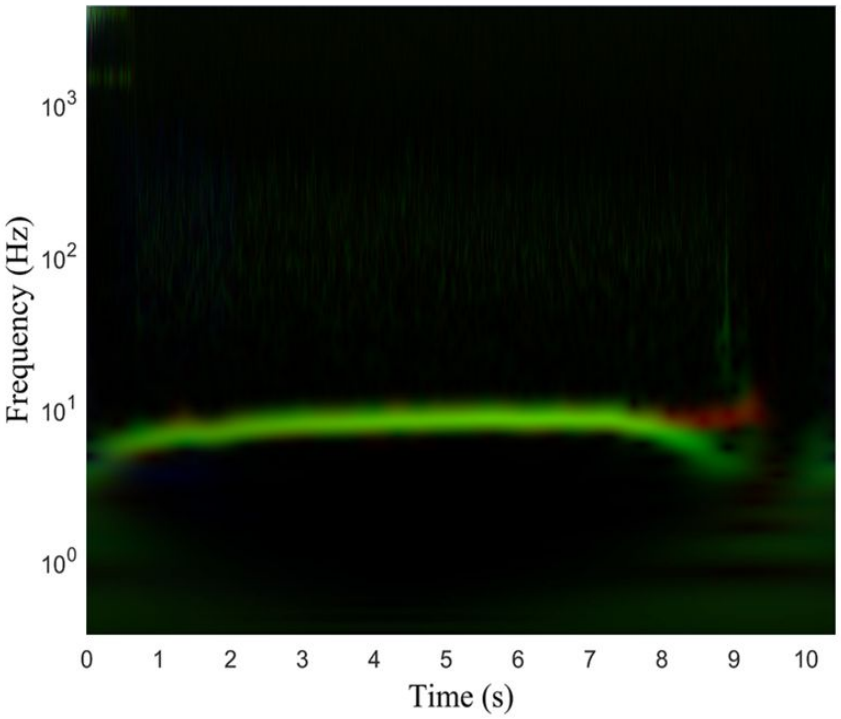

Figure S3. The example of a 3-channel image from Dataset-surface-channels displayed as an RGB image, where scalogram images of response signals from a single complete data collection step or "three-dip" test for **decane** are used. Each channel corresponds to the response collected from a droplet evaporation event of **decane** from the differently-treated cleaved optical fiber sensor head surfaces, namely intrinsic (green channel), hydrophobic (red channel), and hydrophilic (blue channel).

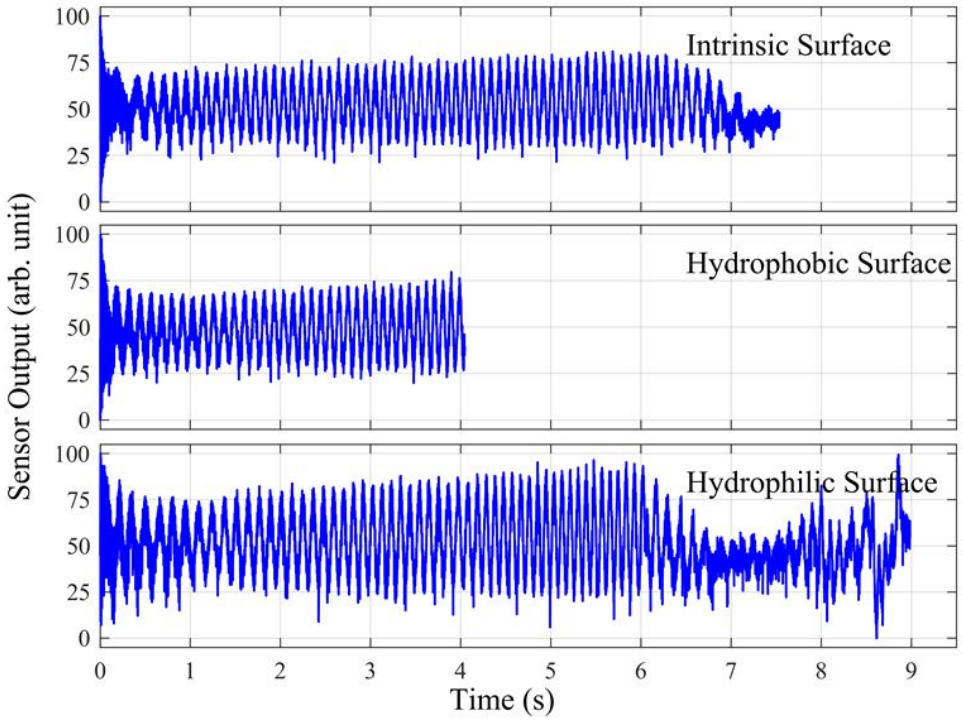

Figure S4. An example of time-domain evaporation transient response signals for evaporating droplets of **dimethylformamide** using an array of three fiber-optic sensors. Each signal corresponds to an evaporation event of a single **dimethylformamide** droplet from a single surface in the array of sensor. For comparison, the x-axis is set to a range of 0 to 9.5 seconds for all evaporation transients, so that response signals of varying durations can be compared.

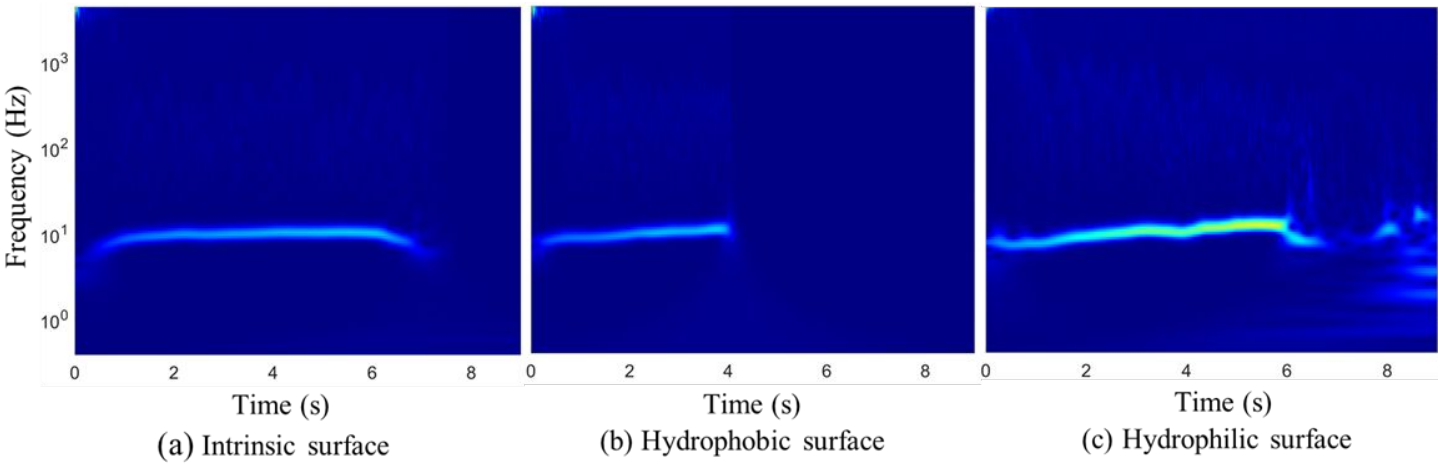

Figure S5. Comparison of the scalograms for the evaporation events for **dimethylformamide** from the "three-dip" test. Response signals from **dimethylformamide** droplet evaporation on (a) the intrinsic surface, (b) the hydrophobic surface, and (c) the hydrophilic surface for the "three-dip" test are shown.

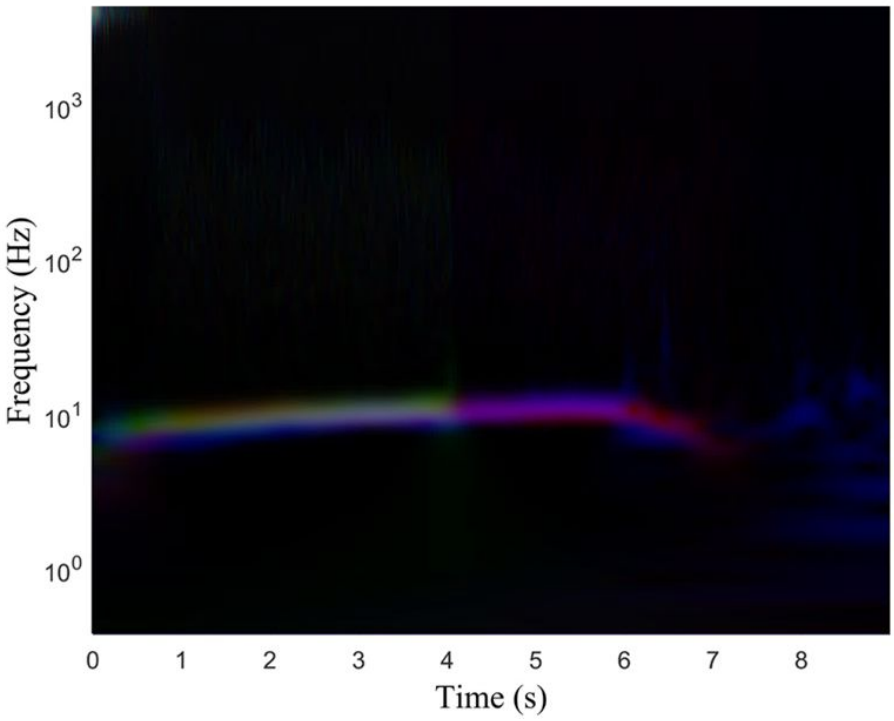

Figure S6. The example of a 3-channel image from Dataset-surface-channels displayed as an RGB image, where scalogram images of response signals from a single complete data collection step or "three-dip" test for **dimethylformamide** are used. Each channel corresponds to the response collected from a droplet evaporation event of **dimethylformamide** from the differently-treated cleaved optical fiber sensor head surfaces, namely intrinsic (green channel), hydrophobic (red channel), and hydrophilic (blue channel).

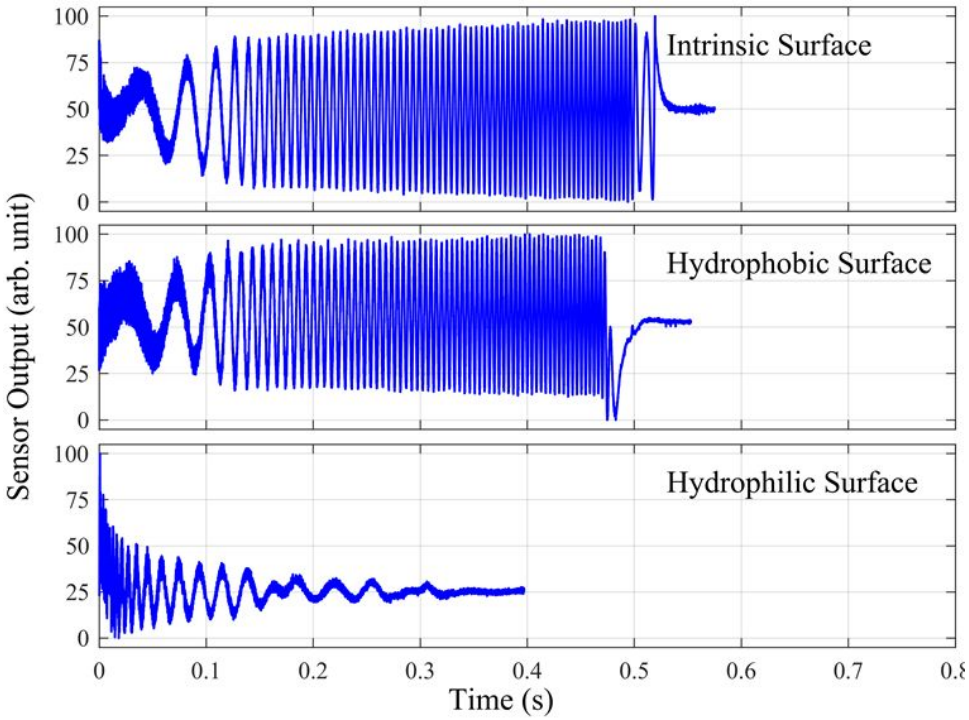

Figure S7. An example of time-domain evaporation transient response signals for evaporating droplets of **isooctane** using an array of three fiber-optic sensors. Each signal corresponds to an evaporation event of a single **isooctane** droplet from a single surface in the array of sensor. For comparison, the x-axis is set to a range of 0 to 0.8 seconds for all evaporation transients, so that response signals of varying durations can be compared.

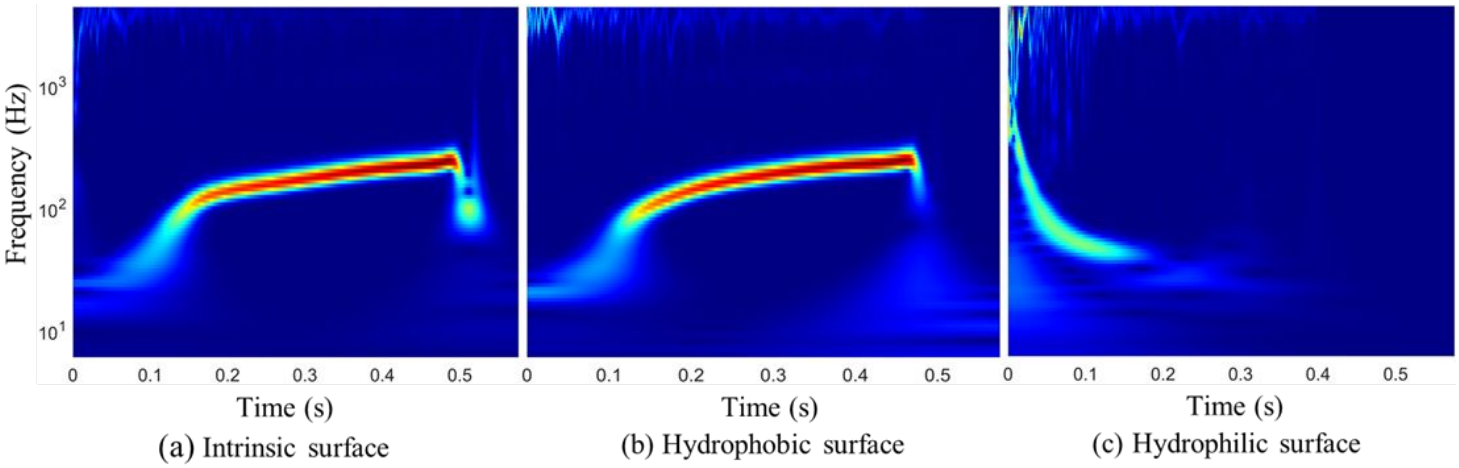

Figure S8. Comparision of the scalograms for the evaporation events for **isooctane** from the "three-dip" test. Response signals from **isooctane** droplet evaporation on (a) the intrinsic surface, (b) the hydrophobic surface, and (c) the hydrophilic surface for the "three-dip" test are shown.

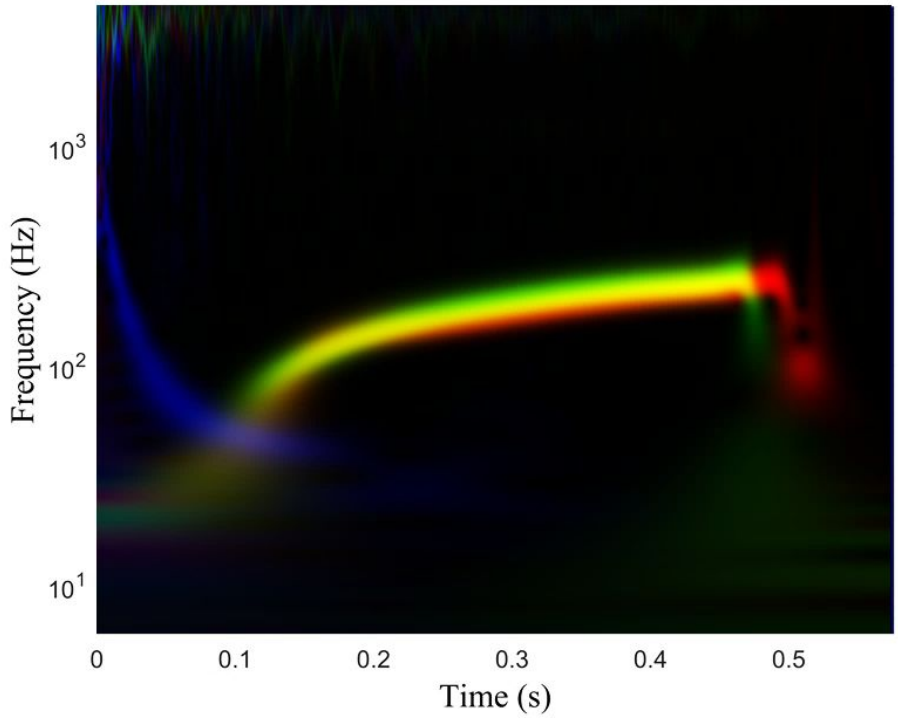

Figure S9. The example of a 3-channel image from Dataset-surface-channels displayed as an RGB image, where scalogram images of response signals from a single complete data collection step or "three-dip" test for **isooctane** are used. Each channel corresponds to the response collected from a droplet evaporation event of **isooctane** from the differently-treated cleaved optical fiber sensor head surfaces, namely intrinsic (green channel), hydrophobic (red channel), and hydrophilic (blue channel).

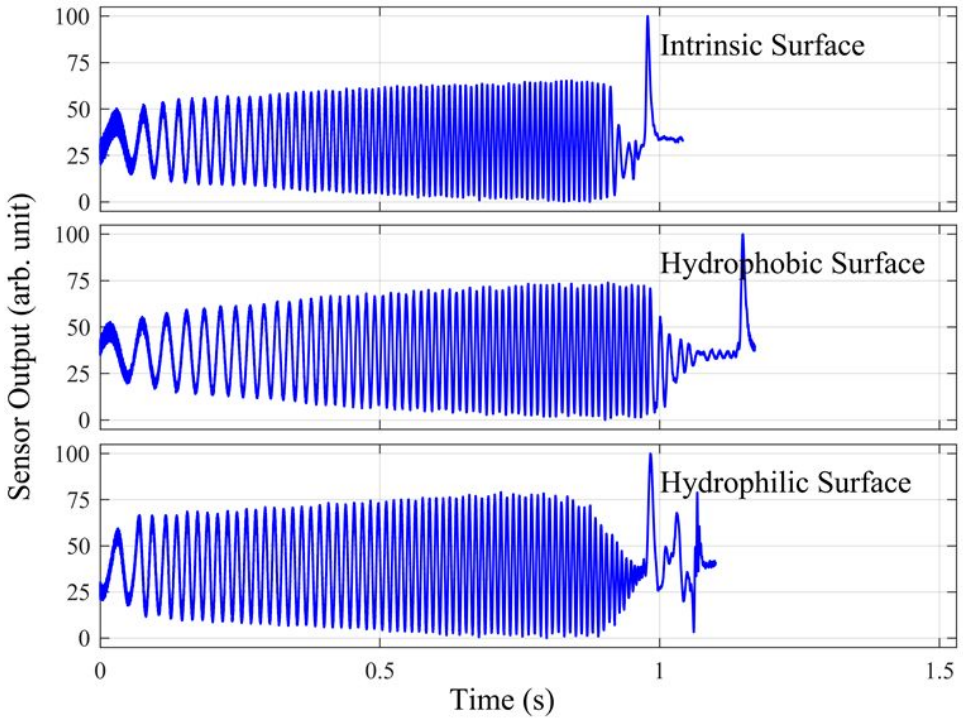

Figure S10. An example of time-domain evaporation transient response signals for evaporating droplets of **2-propanol** using an array of three fiber-optic sensors. Each signal corresponds to an evaporation event of a single **2-propanol** droplet from a single surface in the array of sensor. For comparison, the x-axis is set to a range of 0 to 1.5 seconds for all evaporation transients, so that response signals of varying durations can be compared.

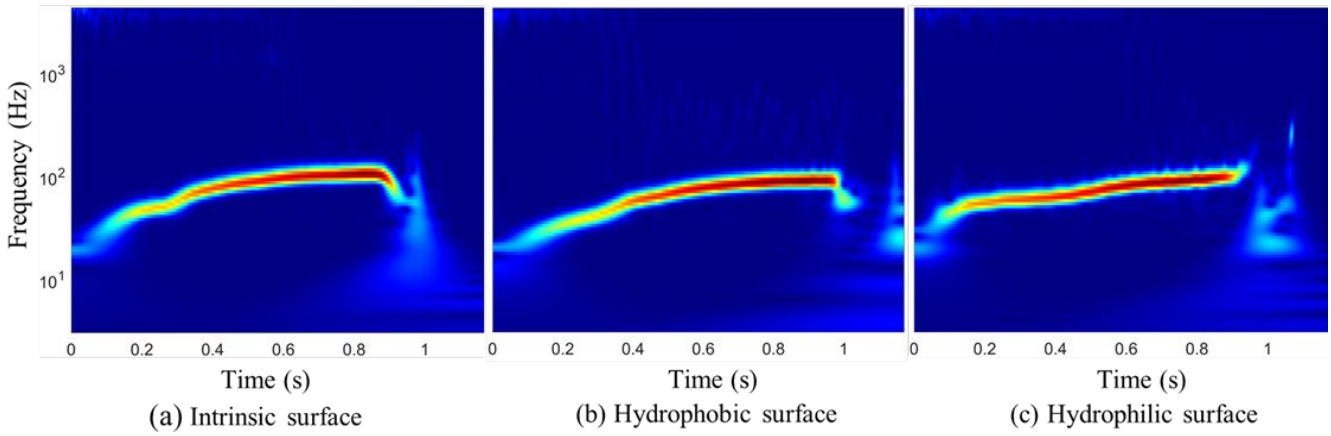

Figure S11. Comparison of the scalograms for the evaporation events for **2-propanol** from the "three-dip" test. Response signals from **2-propanol** droplet evaporation on (a) the intrinsic surface, (b) the hydrophobic surface, and (c) the hydrophilic surface for the "three-dip" test are shown.

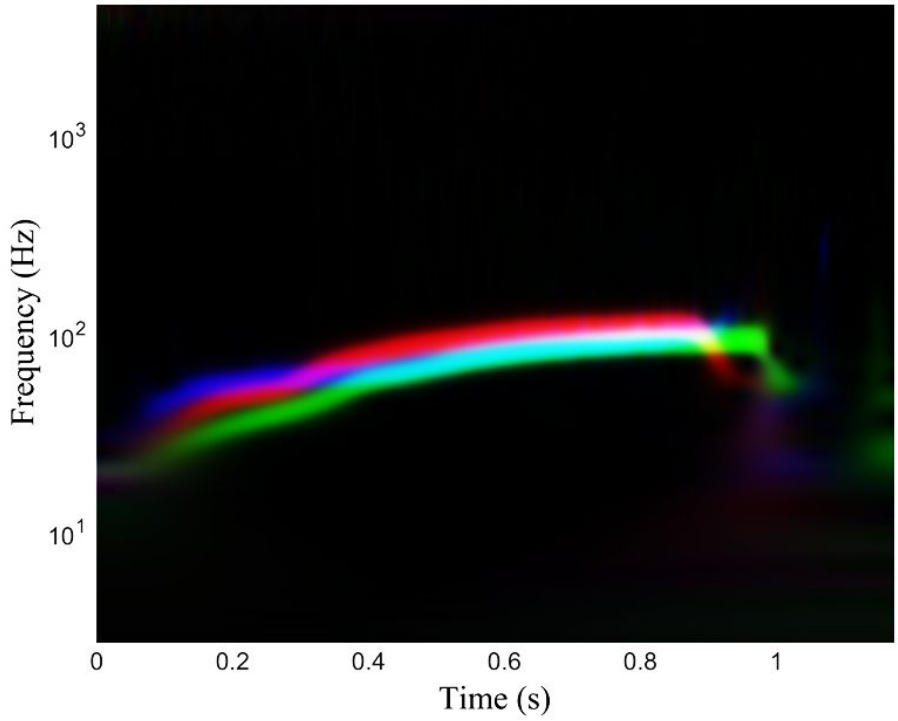

Figure S12. The example of a 3-channel image from Dataset-surface-channels displayed as an RGB image, where scalogram images of response signals from a single complete data collection step or "three-dip" test for **2-propanol** are used. Each channel corresponds to the response collected from a droplet evaporation event of **2-propanol** from the differently-treated cleaved optical fiber sensor head surfaces, namely intrinsic (green channel), hydrophobic (red channel), and hydrophilic (blue channel).

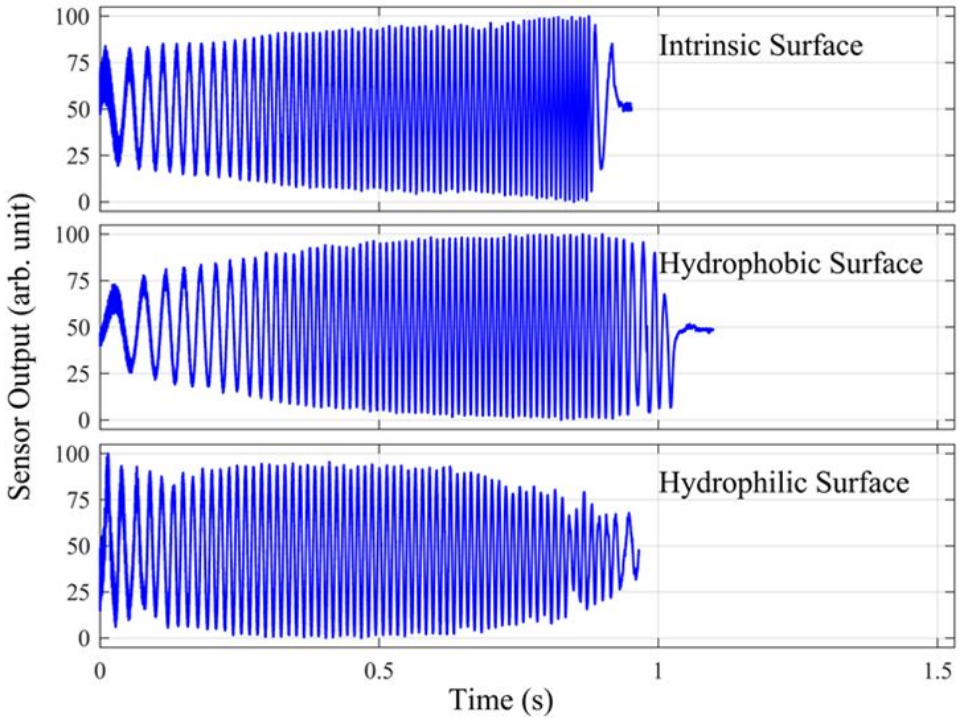

Figure S13. An example of time-domain evaporation transient response signals for evaporating droplets of **ethanol** using an array of three fiber-optic sensors. Each signal corresponds to an evaporation event of a single **ethanol** droplet from a single surface in the array of sensor. For comparison, the x-axis is set to a range of 0 to 1.5 seconds for all evaporation transients, so that response signals of varying durations can be compared.

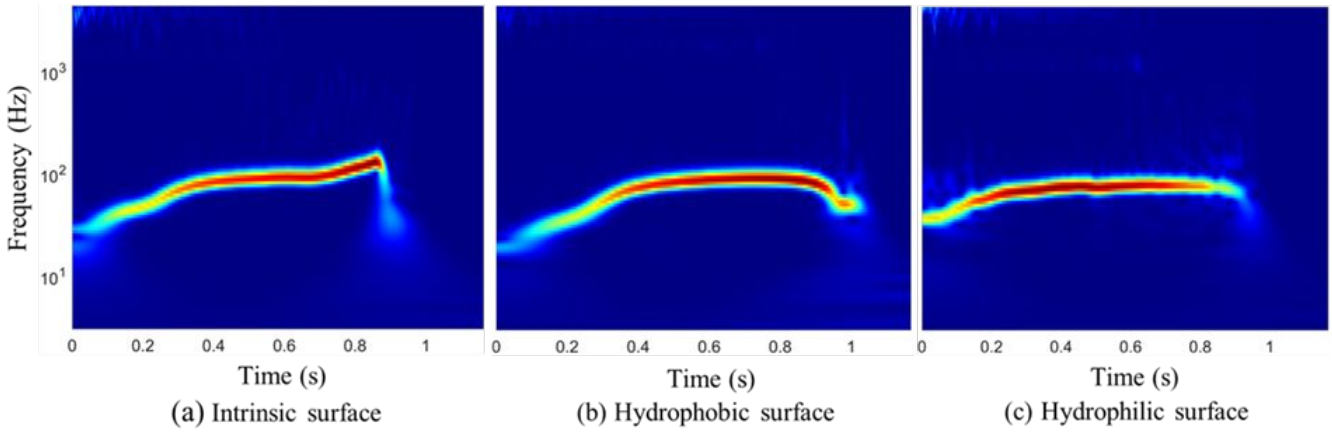

Figure S14. Comparison of the scalograms for the evaporation events for **ethanol** from the "three-dip" test. Response signals from **ethanol** droplet evaporation on (a) the intrinsic surface, (b) the hydrophobic surface, and (c) the hydrophilic surface for the "three-dip" test are shown.

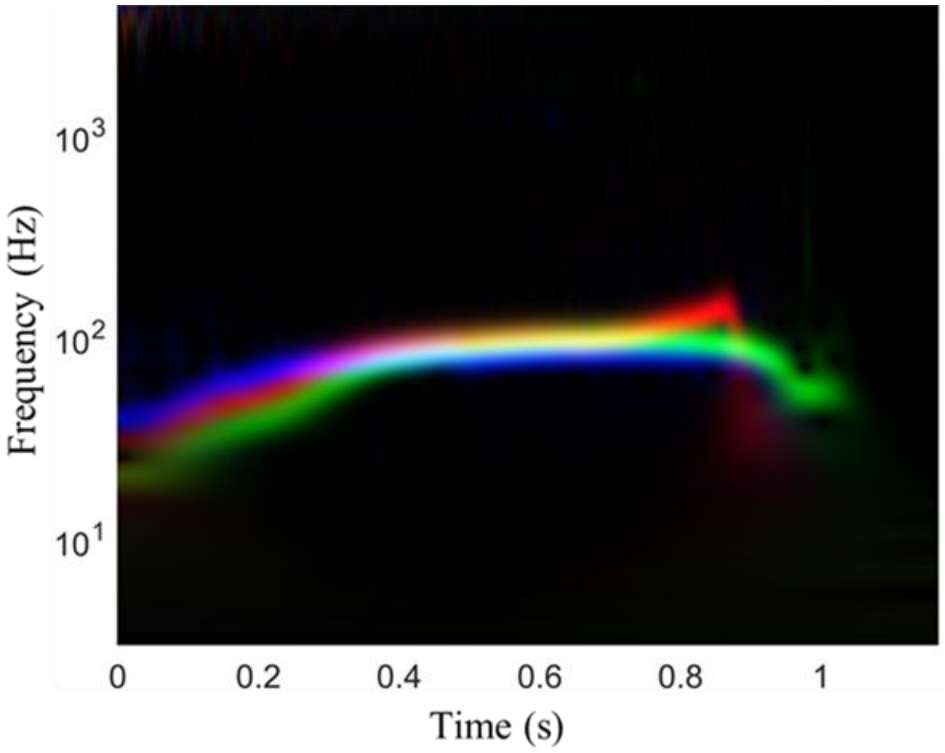

Figure S15. The example of a 3-channel image from Dataset-surface-channels displayed as an RGB image, where scalogram images of response signals from a single complete data collection step or "three-dip" test for **ethanol** are used. Each channel corresponds to the response collected from a droplet evaporation event of **ethanol** from the differently-treated cleaved optical fiber sensor head surfaces, namely intrinsic (green channel), hydrophobic (red channel), and hydrophilic (blue channel).

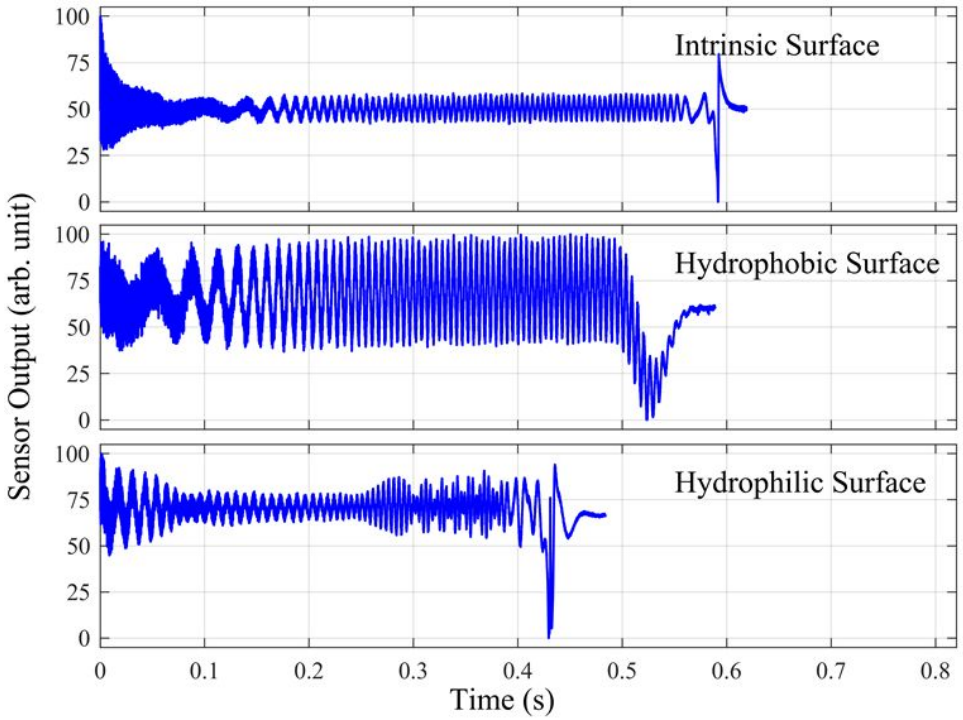

Figure S16. An example of time-domain evaporation transient response signals for evaporating droplets of **trichloroethylene** using an array of three fiber-optic sensors. Each signal corresponds to an evaporation event of a single **trichloroethylene** droplet from a single surface in the array of sensor. For comparison, the x-axis is set to a range of 0 to 0.8 seconds for all evaporation transients, so that response signals of varying durations can be compared.

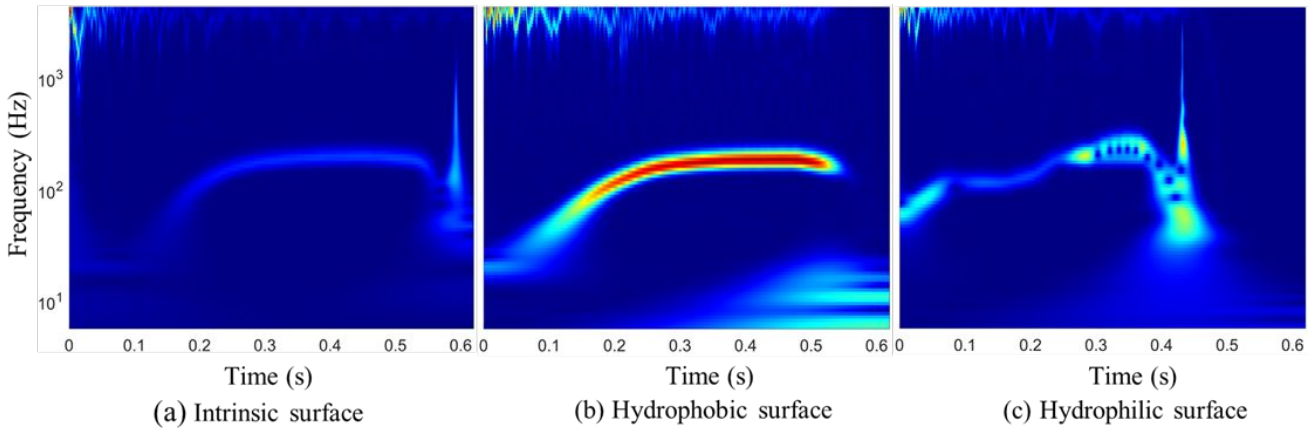

Figure S17. Comparison of the scalograms for the evaporation events for **trichloroethylene** from the "three-dip" test. Response signals from **trichloroethylene** droplet evaporation on (a) the intrinsic surface, (b) the hydrophobic surface, and (c) the hydrophilic surface for the "three-dip" test are shown.

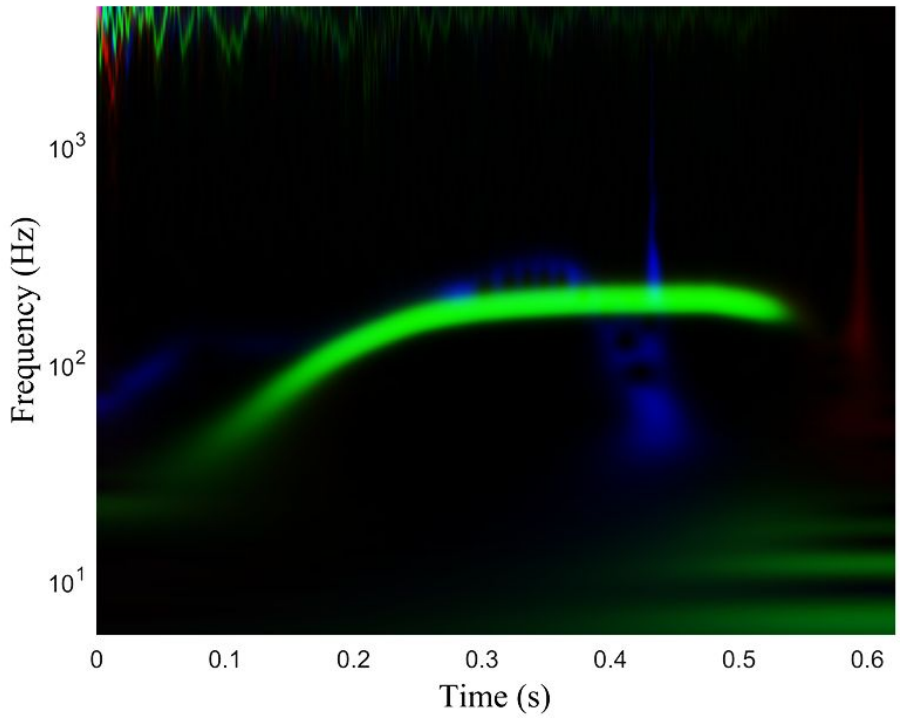

Figure S18. The example of a 3-channel image from Dataset-surface-channels displayed as an RGB image, where scalogram images of response signals from a single complete data collection step or "three-dip" test for **trichloroethylene** are used. Each channel corresponds to the response collected from a droplet evaporation event of **trichloroethylene** from the differently-treated cleaved optical fiber sensor head surfaces, namely intrinsic (green channel), hydrophobic (red channel), and hydrophilic (blue channel).

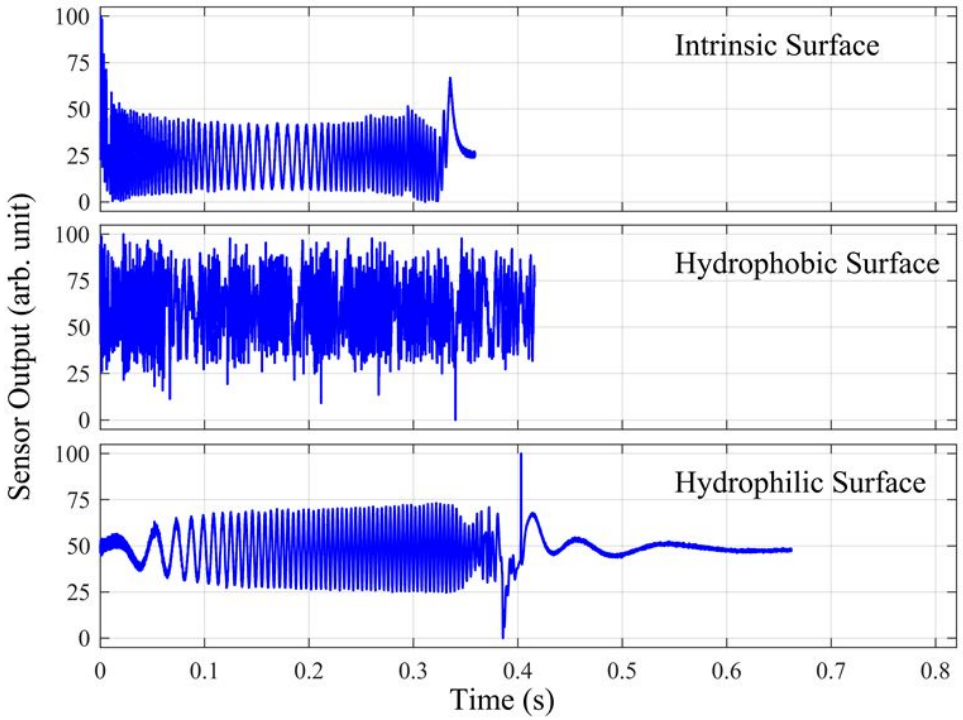

Figure S19. An example of time-domain evaporation transient response signals for evaporating droplets of **ethyl acetate** using an array of three fiber-optic sensors. Each signal corresponds to an evaporation event of a single **ethyl acetate** droplet from a single surface in the array of sensor. For comparison, the x-axis is set to a range of 0 to 0.8 seconds for all evaporation transients, so that response signals of varying durations can be compared.

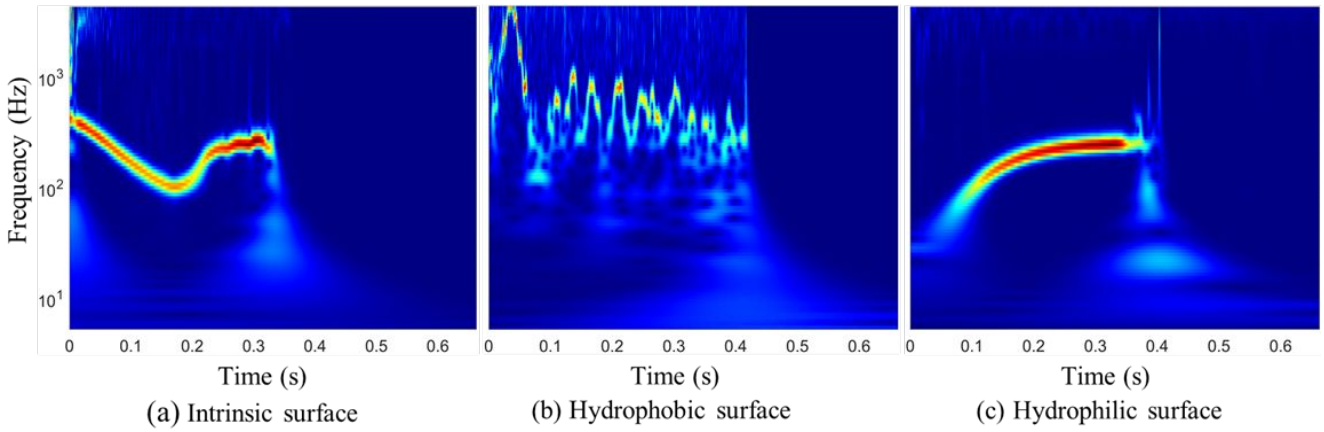

Figure S20. Comparison of the scalograms for the evaporation events for **ethyl acetate** from the "three-dip" test. Response signals from **ethyl acetate** droplet evaporation on (a) the intrinsic surface, (b) the hydrophobic surface, and (c) the hydrophilic surface for the "three-dip" test are shown.

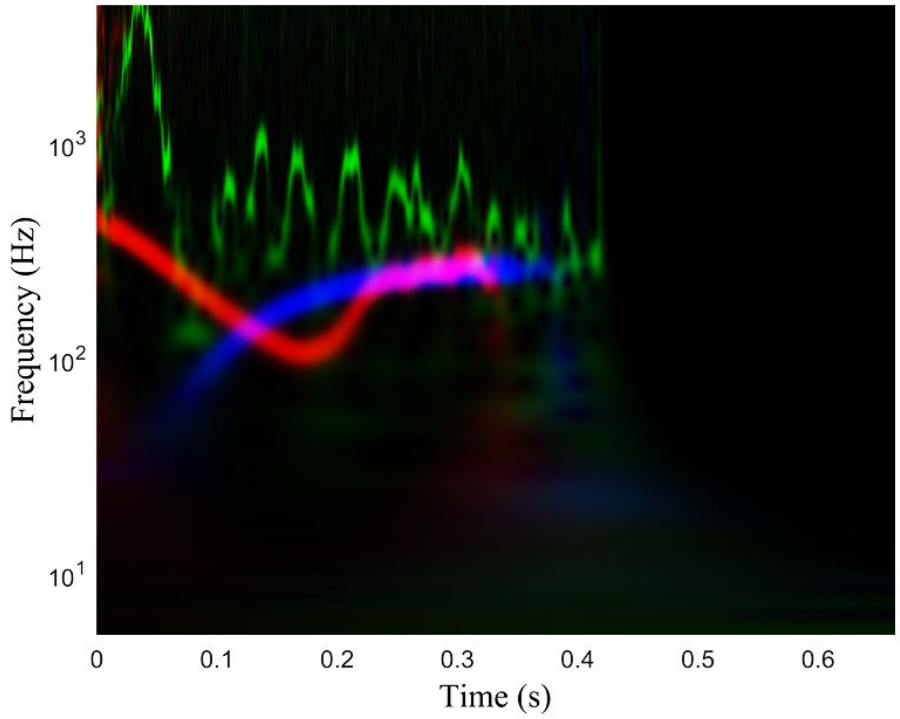

Figure S21. The example of a 3-channel image from Dataset-surface-channels displayed as an RGB image, where scalogram images of response signals from a single complete data collection step or "three-dip" test for **ethyl acetate** are used. Each channel corresponds to the response collected from a droplet evaporation event of **ethyl acetate** from the differently-treated cleaved optical fiber sensor head surfaces, namely intrinsic (green channel), hydrophobic (red channel), and hydrophilic (blue channel).

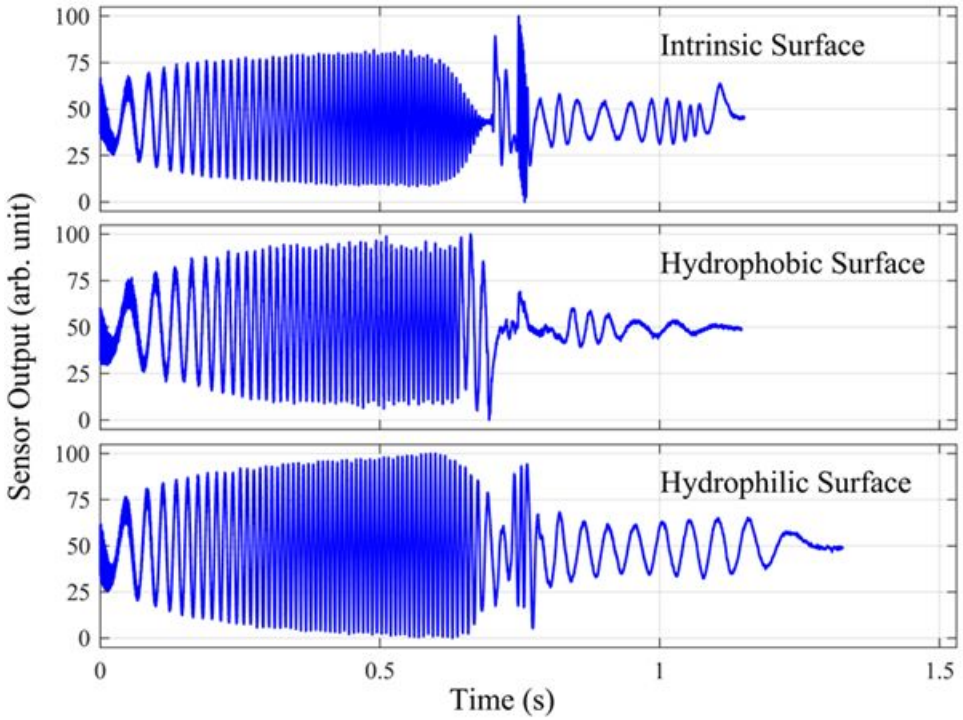

Figure S22. An example of time-domain evaporation transient response signals for evaporating droplets of **methanol** using an array of three fiber-optic sensors. Each signal corresponds to an evaporation event of a single **methanol** droplet from a single surface in the array of sensor. For comparison, the x-axis is set to a range of 0 to 1.5 seconds for all evaporation transients, so that response signals of varying durations can be compared.

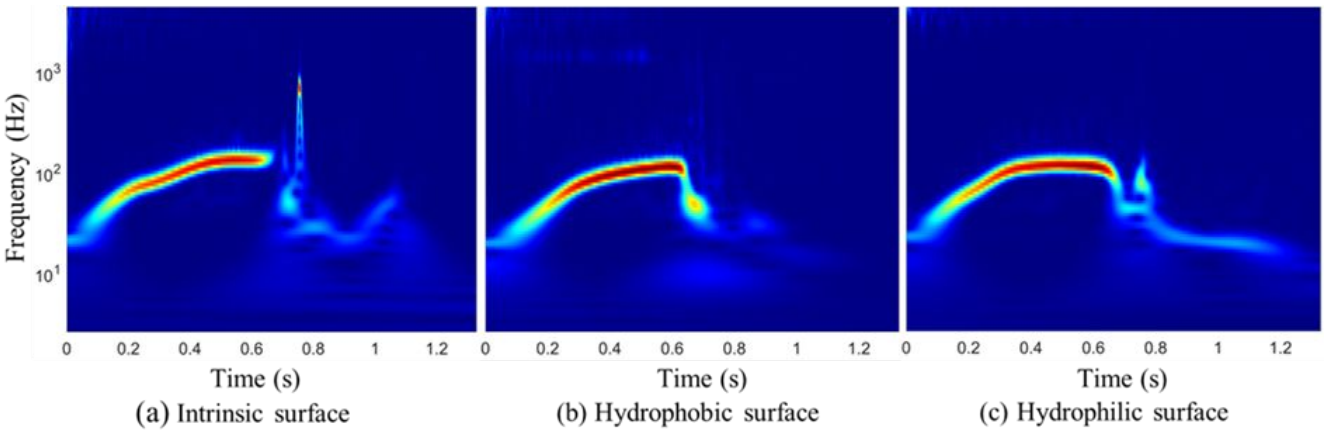

Figure S23. Comparison of the scalograms for the evaporation events for **methanol** from the "three-dip" test. Response signals from **methanol** droplet evaporation on (a) the intrinsic surface, (b) the hydrophobic surface, and (c) the hydrophilic surface for the "three-dip" test are shown.

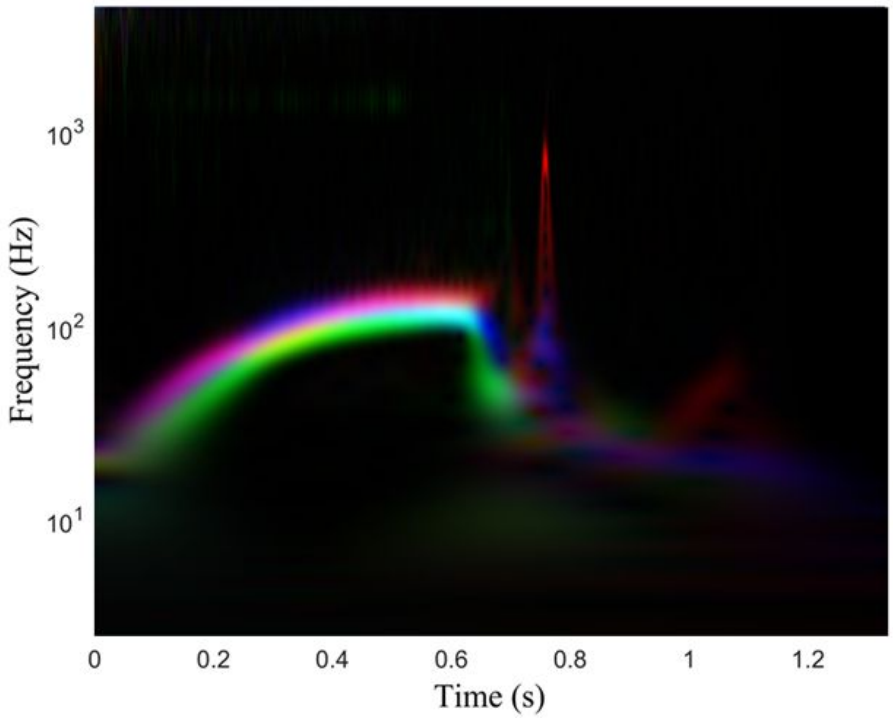

Figure S24. The example of a 3-channel image from Dataset-surface-channels displayed as an RGB image, where scalogram images of response signals from a single complete data collection step or "three-dip" test for methanol are used. Each channel corresponds to the response collected from a droplet evaporation event of methanol from the differently-treated cleaved optical fiber sensor head surfaces, namely intrinsic (green channel), hydrophobic (red channel), and hydrophilic (blue channel).

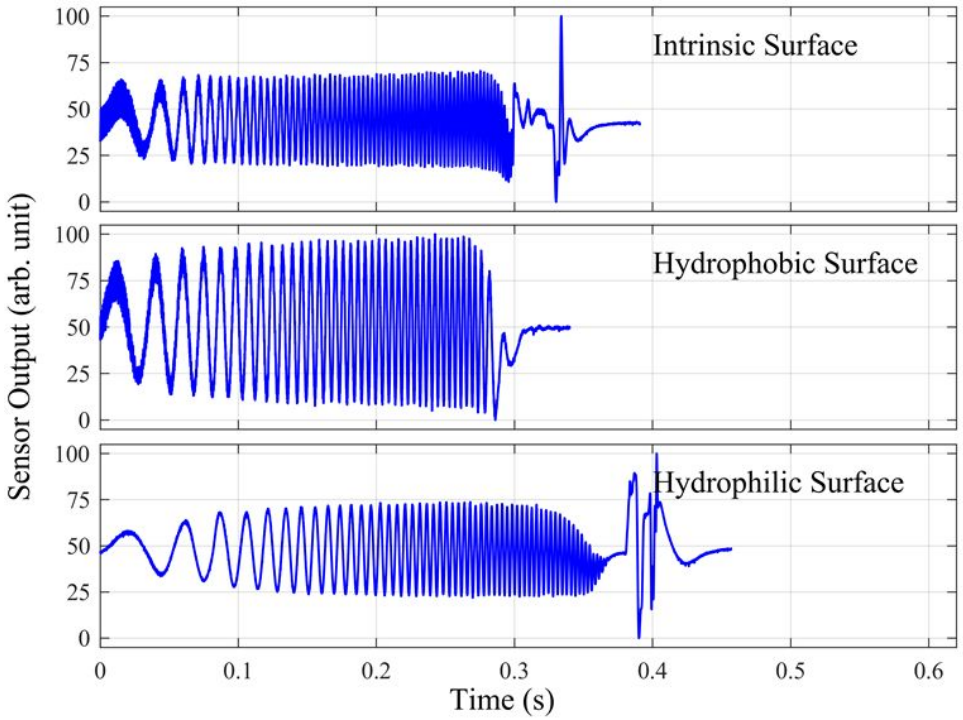

Figure S25. An example of time-domain evaporation transient response signals for evaporating droplets of **acetone** using an array of three fiber-optic sensors. Each signal corresponds to an evaporation event of a single **acetone** droplet from a single surface in the array of sensor. For comparison, the x-axis is set to a range of 0 to 0.6 seconds for all evaporation transients, so that response signals of varying durations can be compared.

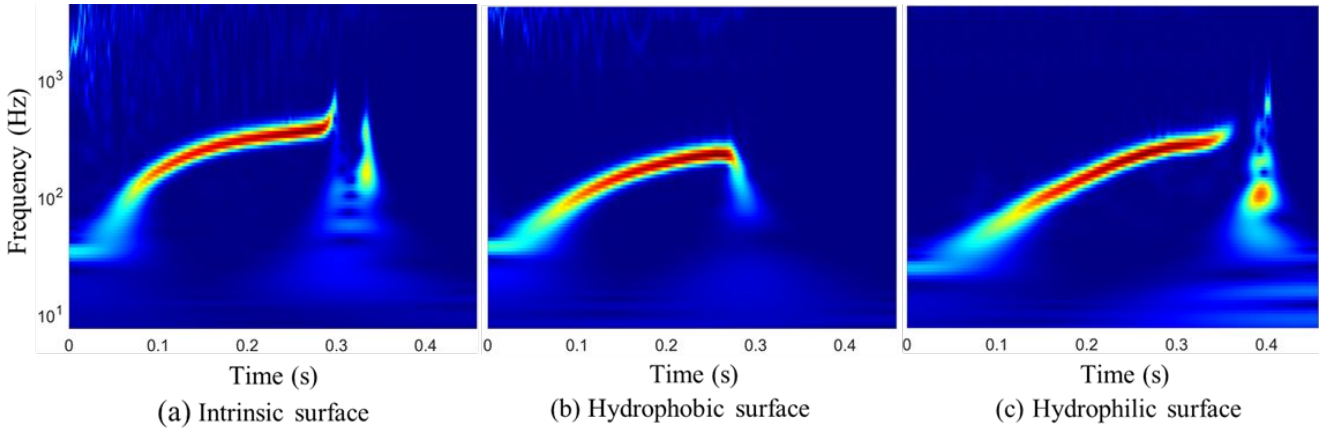

Figure S26. Comparison of the scalograms for the evaporation events for **acetone** from the "three-dip" test. Response signals from **acetone** droplet evaporation on (a) the intrinsic surface, (b) the hydrophobic surface, and (c) the hydrophilic surface for the "three-dip" test are shown.

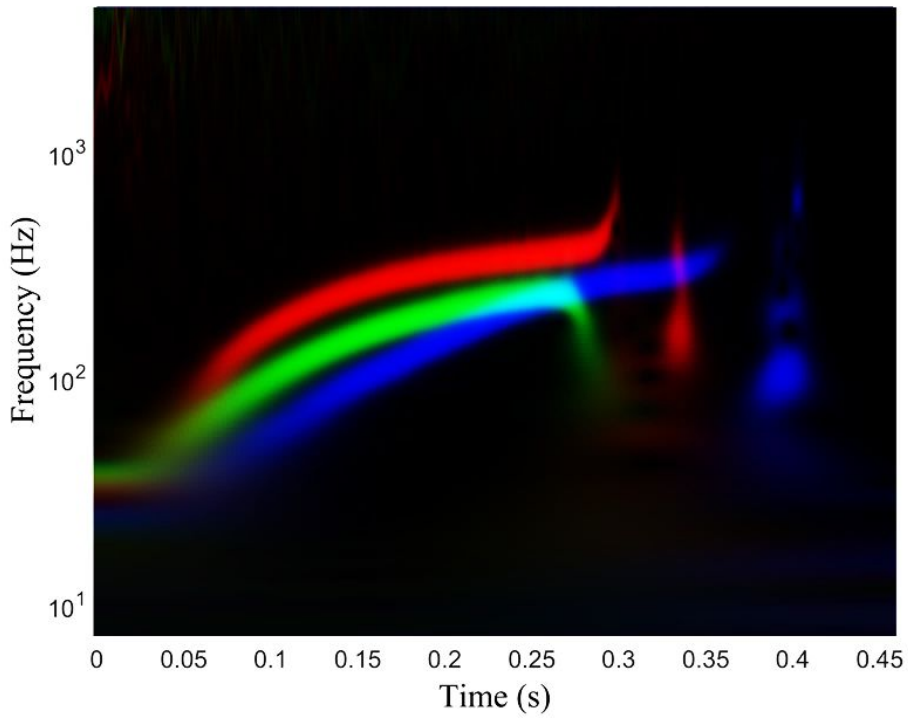

Figure S27. The example of a 3-channel image from Dataset-surface-channels displayed as an RGB image, where scalogram images of response signals from a single complete data collection step or "three-dip" test for **acetone** are used. Each channel corresponds to the response collected from a droplet evaporation event of **acetone** from the differently-treated cleaved optical fiber sensor head surfaces, namely intrinsic (green channel), hydrophobic (red channel), and hydrophilic (blue channel).

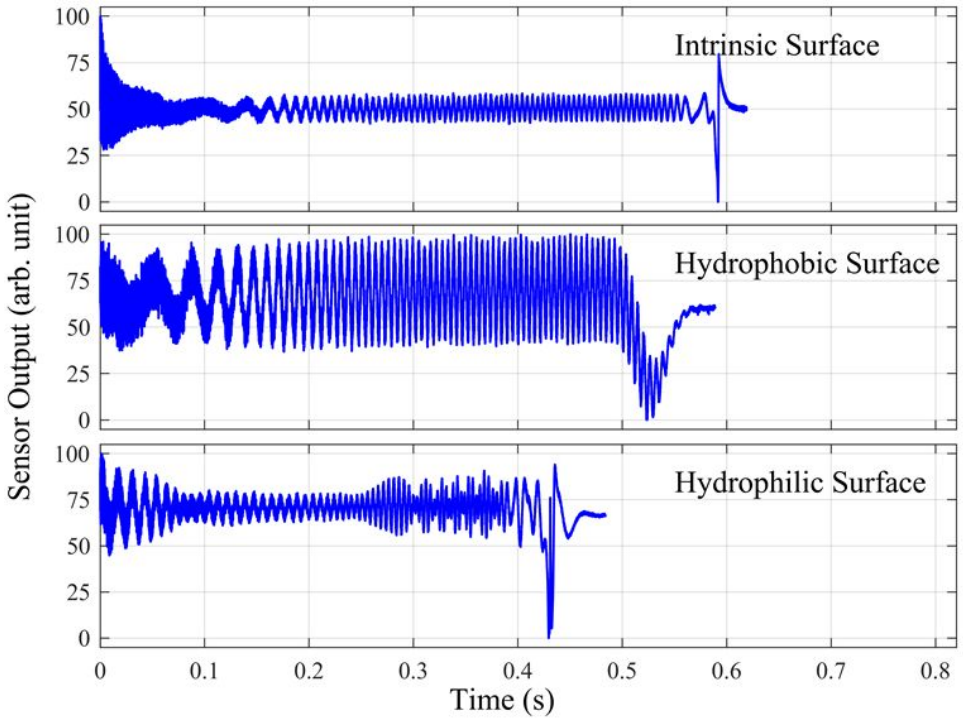

Figure S28. An example of time-domain evaporation transient response signals for evaporating droplets of **dichloromethane (DCM)** using an array of three fiber-optic sensors. Each signal corresponds to an evaporation event of a single **dichloromethane (DCM)** droplet from a single surface in the array of sensor. For comparison, the x-axis is set to a range of 0 to 0.8 seconds for all evaporation transients, so that response signals of varying durations can be compared.

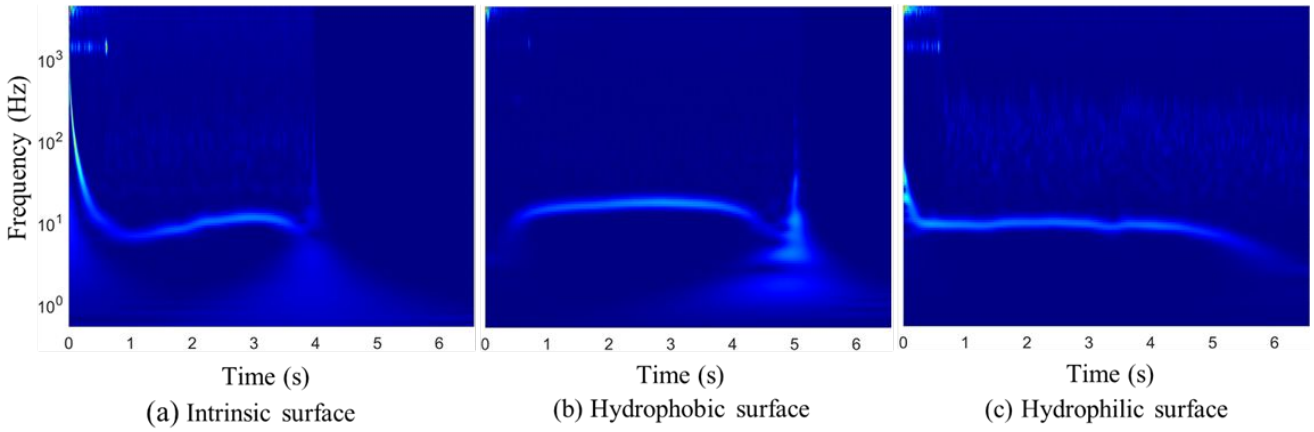

Figure S29. Comparison of the scalograms for the evaporation events for **dichloromethane (DCM)** from the "three-dip" test. Response signals from **dichloromethane (DCM)** droplet evaporation on (a) the intrinsic surface, (b) the hydrophobic surface, and (c) the hydrophilic surface for the "three-dip" test are shown.

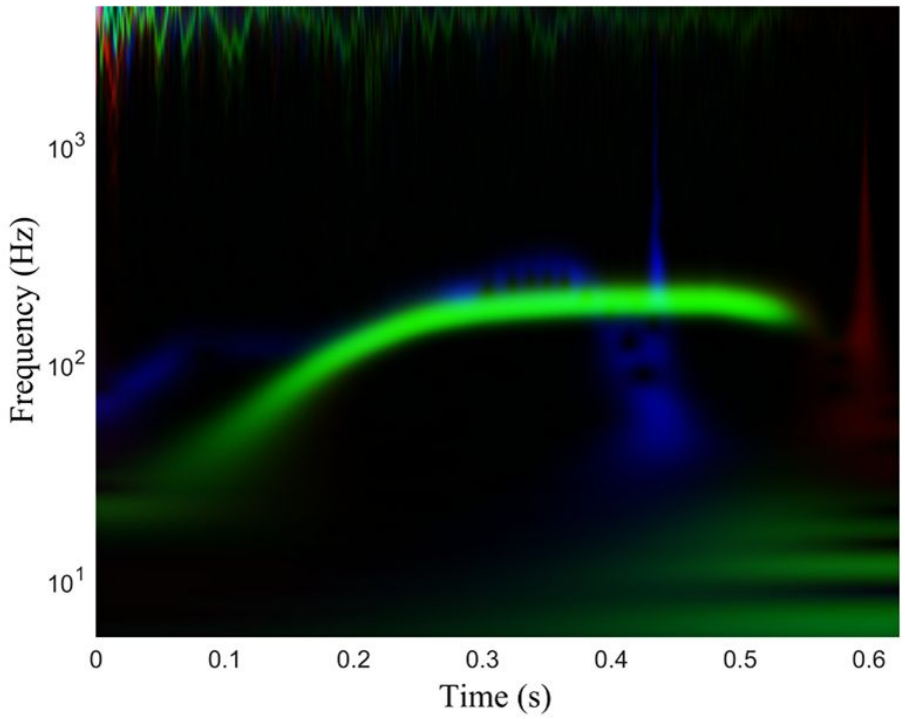

Figure S30. The example of a 3-channel image from Dataset-surface-channels displayed as an RGB image, where scalogram images of response signals from a single complete data collection step or "three-dip" test for **dichloromethane (DCM)** are used. Each channel corresponds to the response collected from a droplet evaporation event of **dichloromethane (DCM)** from the differently-treated cleaved optical fiber sensor head surfaces, namely intrinsic (green channel), hydrophobic (red channel), and hydrophilic (blue channel).

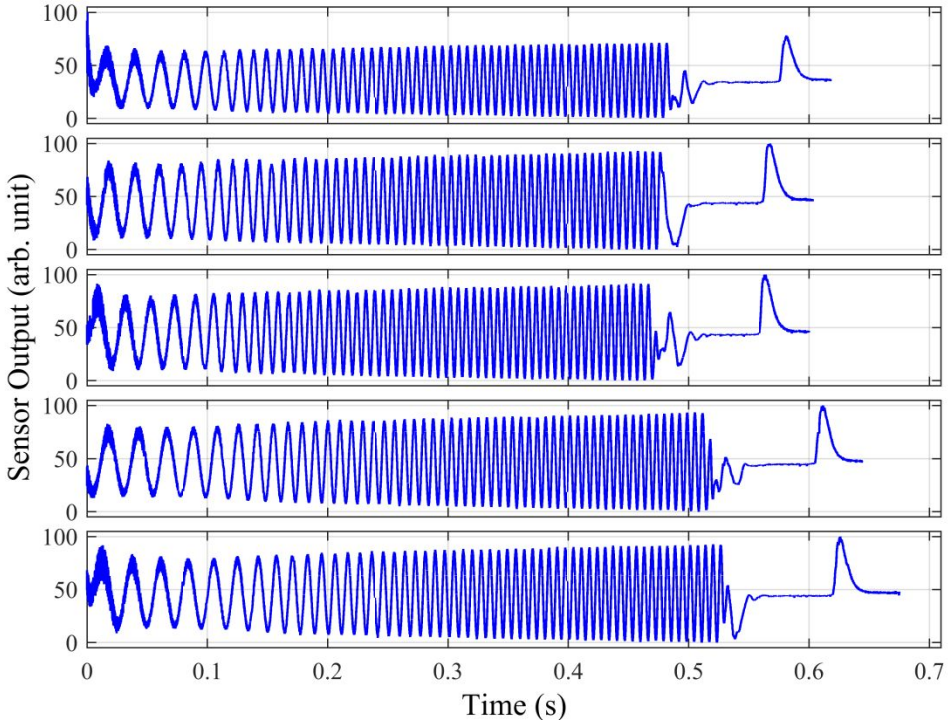

Figure S31. Examples of time-domain evaporation transient response signals for droplet evaporation experiments using **acetonitrile** on **an innate (untreated cleaved tip sensor)** tip sensor. The similarity in transient responses show that the experiments were repeatable and reproducible.

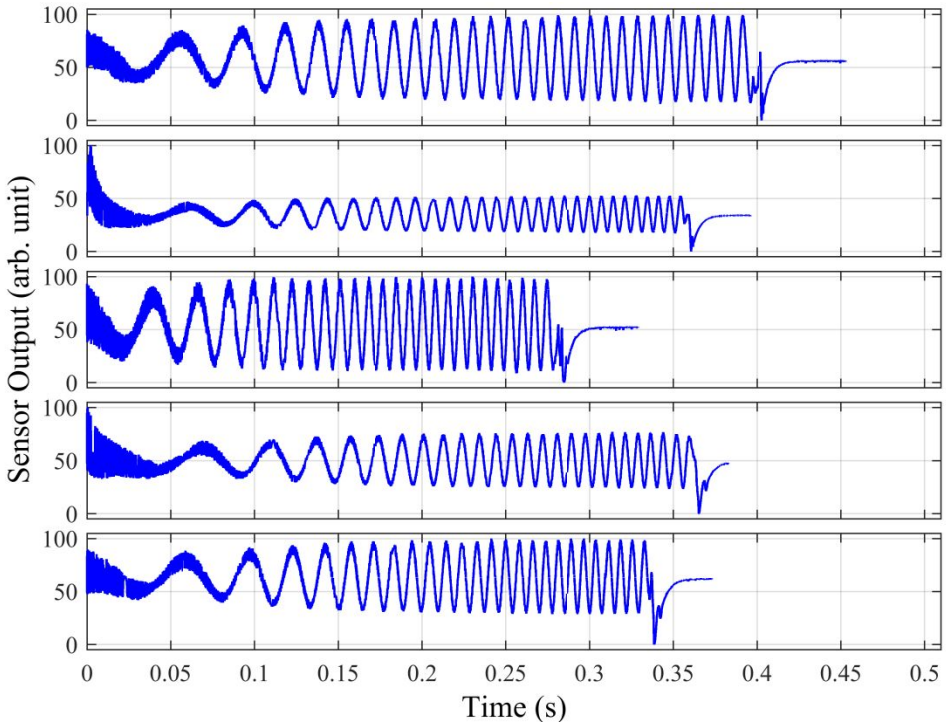

Figure S32. Examples of time-domain evaporation transient response signals for droplet evaporation experiments using **acetonitrile** on **a hydrophobic-surface** tip sensor. The similarity in transient responses show that the experiments were repeatable and reproducible.

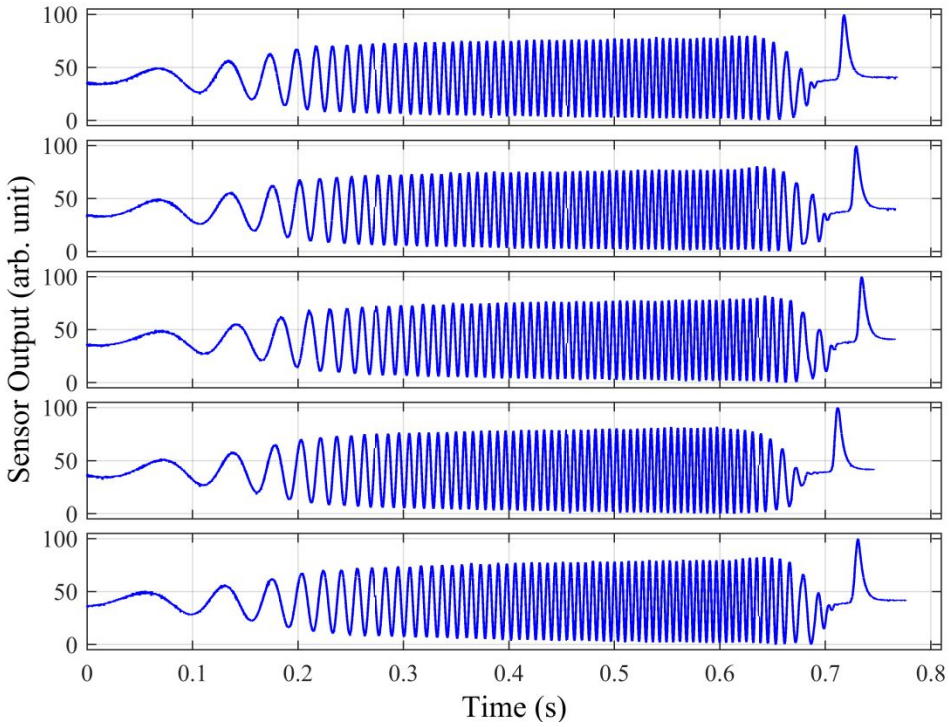

Figure S33. Examples of time-domain evaporation transient response signals for droplet evaporation experiments using **acetonitrile** on **a hydrophilic-surface** tip sensor. The similarity in transient responses show that the experiments were repeatable and reproducible.