

## Article

# Supplementary Material of: A New Methodology for Early Detection of Failures in Lithium-Ion Batteries

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## Supplementary Material



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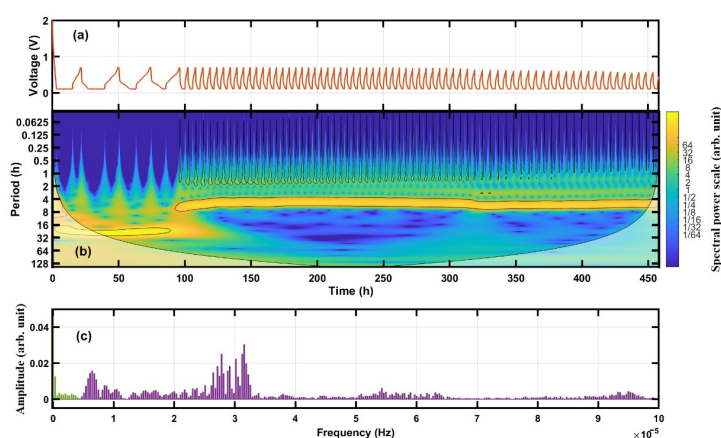
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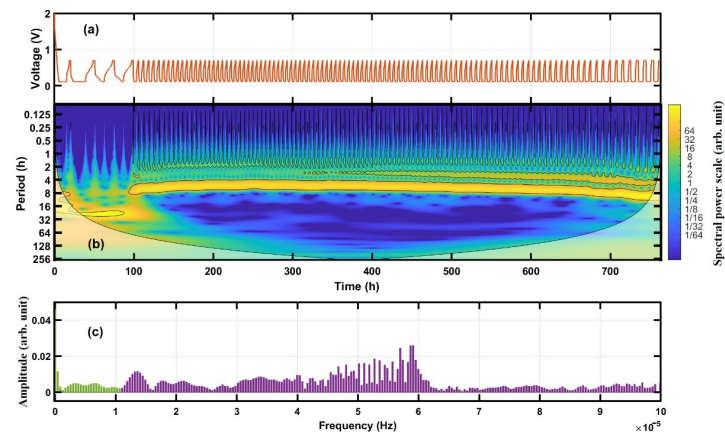
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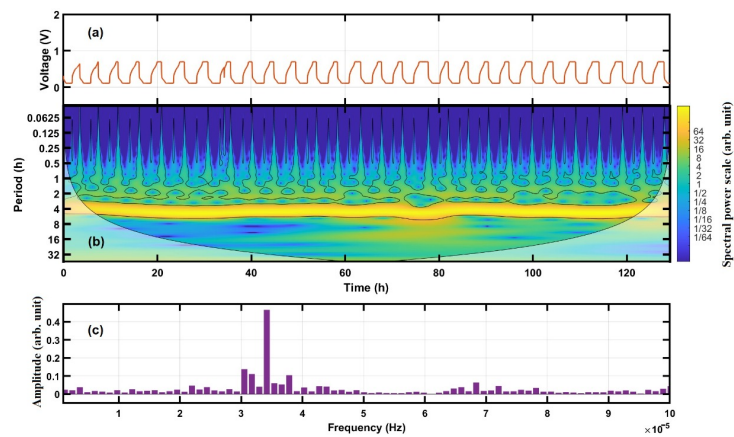
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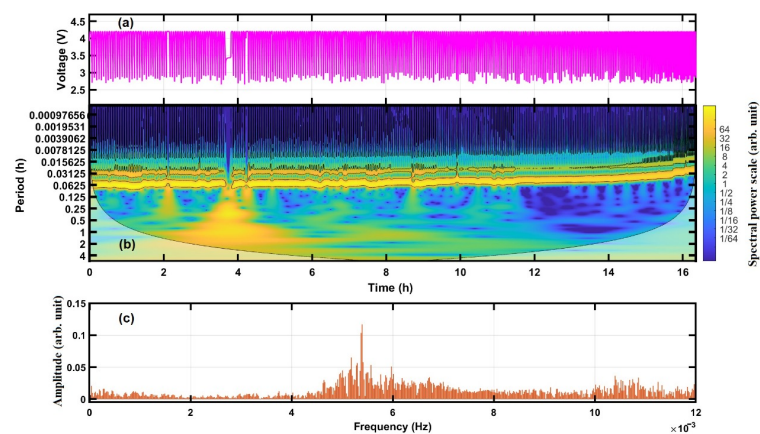
**Figure S1.** (a) Voltage, (b) wavelet spectral power, and (c) and Fourier spectra of the cycling test performed by IF-BUAP to HC1 cell.



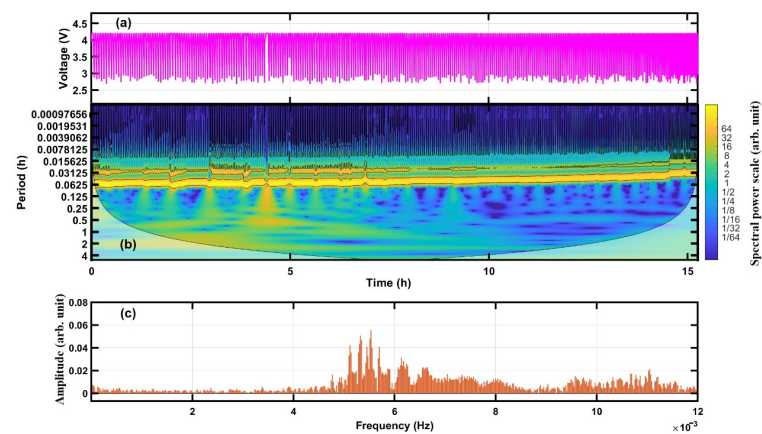
**Figure S2.** (a) Voltage, (b) wavelet spectral power, and (c) Fourier spectra of the cycling test performed by IF-BUAP to HC2 cell.



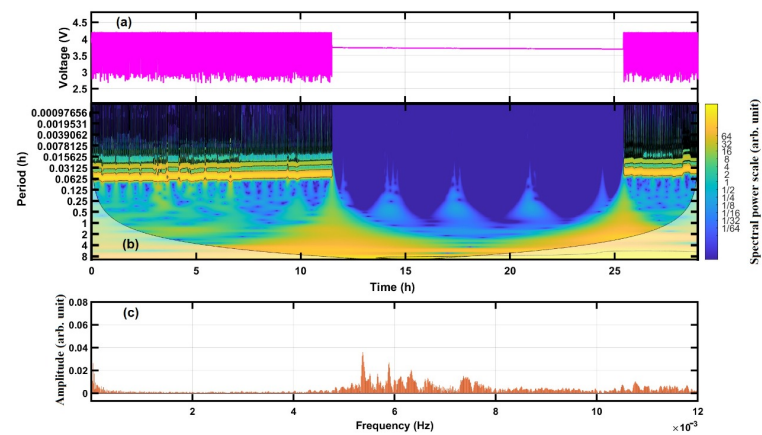
**Figure S3.** (a) Voltage, (b) wavelet spectral power, and (c) Fourier spectra of the cycling test performed by IF-BUAP to HC4 cell.



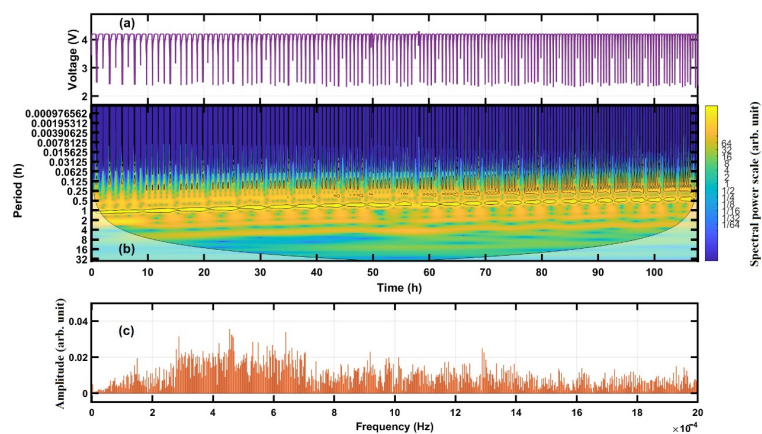
**Figure S4.** (a) Voltage, (b) wavelet spectral power, and (c) Fourier spectra of the cycling test performed by CALCE to the prismatic cell tested a 35°C (PC-35C).



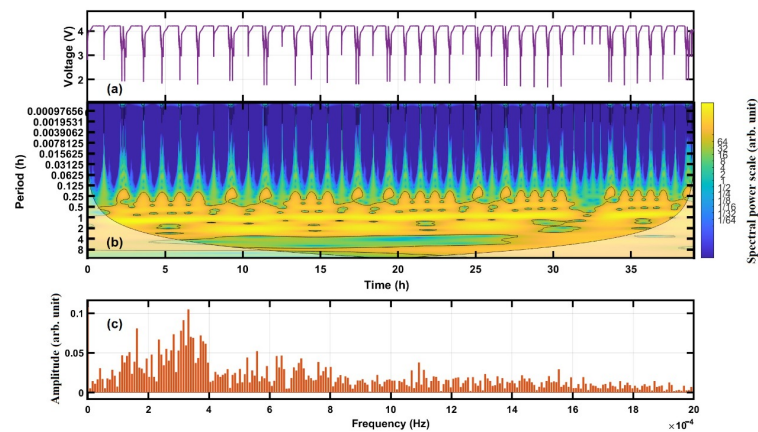
**Figure S5.** (a) Voltage, (b) wavelet spectral power, and (c) Fourier spectra of the cycling test performed by CALCE to the prismatic cell tested at  $45^{\circ}\text{C}$  (PC-45C).



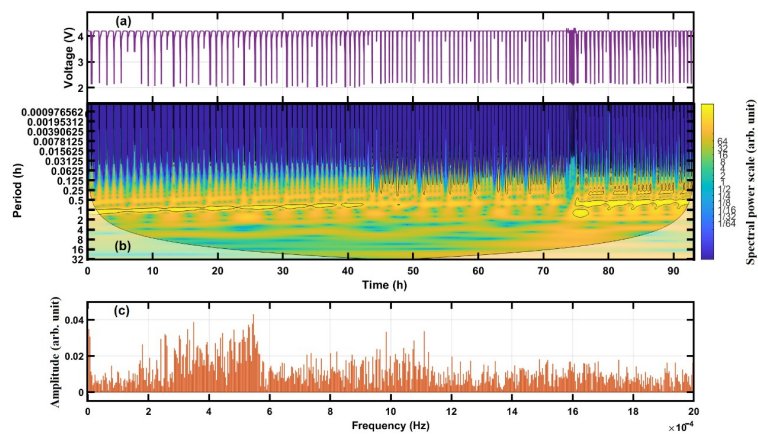
**Figure S6.** (a) Voltage, (b) wavelet spectral power, and (c) Fourier spectra of the cycling test performed by CALCE to the prismatic cell tested at  $55^{\circ}\text{C}$  (PC-55C).



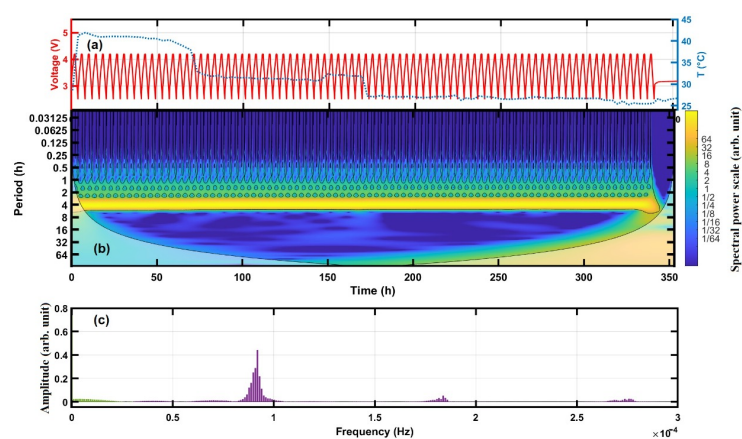
**Figure S7.** (a) Voltage, (b) wavelet spectral power, and (c) Fourier spectra of the cycling test performed by NASA-PCE to commercial lithium-ion cells (C-LIC1).



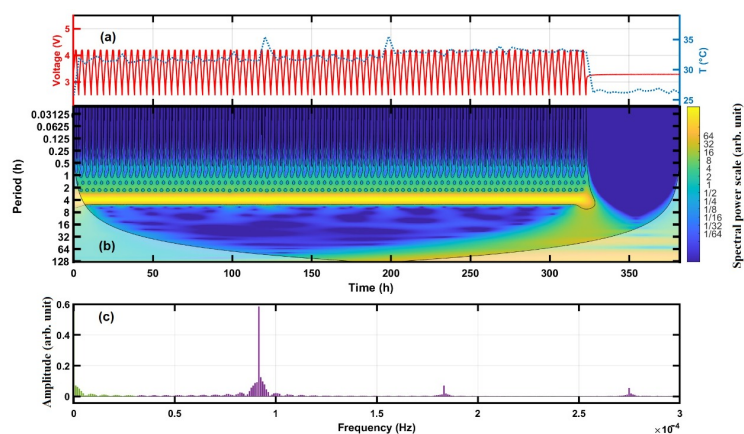
**Figure S8.** (a) Voltage, (b) wavelet spectral power, and (c) Fourier spectra of the cycling test performed by NASA-PCE to commercial lithium-ion cells (C-LIC2).



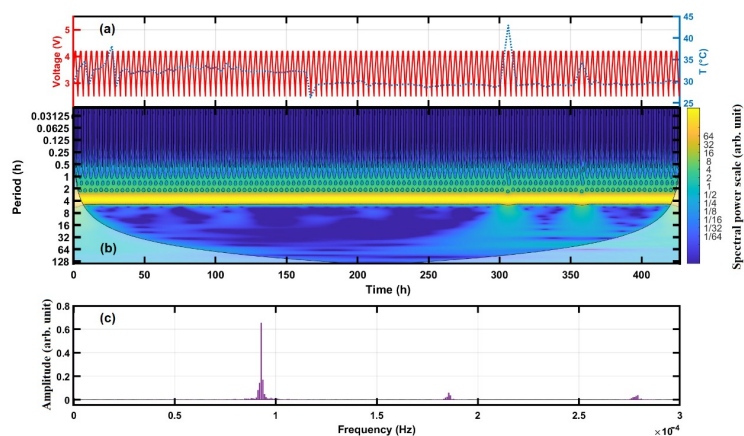
**Figure S9.** (a) Voltage, (b) wavelet spectral power, and (c) Fourier spectra of the cycling test performed by NASA-PCE to commercial lithium-ion cells (C-LIC4).



**Figure S10.** (a) Voltage and cell temperature, (b) wavelet spectral power, and (c) Fourier spectra of the cycling test performed by UCL to one commercial cylindrical battery from the 1 to 84 cycles (CC3500-1).



**Figure S11.** (a) Voltage and cell temperature, (b) wavelet spectral power, and (c) Fourier spectra of the cycling test performed by UCL to one commercial cylindrical battery from the 203 to 285 cycles (CC3500-3).



**Figure S12.** (a) Voltage and cell temperature, (b) wavelet spectral power, and (c) Fourier spectra of the cycling test performed by UCL to one commercial cylindrical battery from the 286 to 400 cycles (CC3500-4).