

Supplementary Information

Manufacturing Scale-Up of Anodeless Solid State Lithium Thin Film Battery for High Volumetric Energy Density Applications

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Supplementary Table S1. Parameters used for VED calculation

| A Al_2O_3 -based Li metal thin film battery | | | | | | | |
|---|-----------|-----------|---------|--------------------|----------|--------------------------------|-----------|
| | Cu | Li metal | LiPON | LiCoO ₂ | Pt | Al ₂ O ₃ | Total |
| Density(g/cm ³) | 8.96 | 0.534 | 2.3 | 4.79 | 21.4 | 3.95 | N/A |
| Thickness (μm) | 0.2 | 1 | 1 | 4 | 0.1 | 500 | N/A |
| Volume (cm ³) | 0.00002 | 0.0001 | 0.0001 | 0.0001 | 0.00001 | 0.05 | 0.05033 |
| Mass (g) | 0.0001792 | 0.0000534 | 0.00023 | 0.000479 | 0.000214 | 0.1975 | 0.1986556 |
| Capacity (mAh) | | 0.206124 | | 0.069 | | | |
| VED (Wh/L) | | | | | | | 21.26 |

| B Mica-based Li metal thin film battery | | | | | | | |
|---|-----------|-----------|---------|--------------------|----------|----------|-----------|
| | Cu | Li metal | LiPON | LiCoO ₂ | Pt | Mica | Total |
| Density(g/cm ³) | 8.96 | 0.534 | 2.3 | 4.79 | 21.4 | 2.885 | N/A |
| Thickness (μm) | 0.2 | 10 | 2 | 6.5 | 0.1 | 70 | N/A |
| Volume (cm ³) | 0.00002 | 0.0005 | 0.0002 | 0.00065 | 0.00001 | 0.007 | 0.00838 |
| Mass (g) | 0.0001792 | 0.000267 | 0.00046 | 0.0031135 | 0.000214 | 0.020195 | 0.0244287 |
| Capacity (mAh) | | 1.03~2.06 | | 0.4485 | | | |
| VED (Wh/L) | | | | | | | 196.98 |

| C SS-based anodeless thin film battery | | | | | | | |
|--|----------|----------|----------|--------------------|----------|---------|----------|
| | Cu | Li metal | LiPON | LiCoO ₂ | Pt | SS | Total |
| Density(g/cm ³) | 8.96 | 0.534 | 2.3 | 4.79 | 21.4 | 7.75 | N/A |
| Thickness (μm) | 0.25 | N/A | 1.5 | 10 | 0.1 | 10 | N/A |
| Volume (cm ³) | 0.000025 | N/A | 0.00015 | 0.001 | 0.00001 | 0.001 | 0.00218 |
| Mass (g) | 0.000224 | N/A | 0.000345 | 0.00479 | 0.000214 | 0.00775 | 0.013323 |
| Capacity (mAh) | | N/A | | 0.69 | | | |
| VED (Wh/L) | | | | | | | 1231.58 |