Supplementary Information

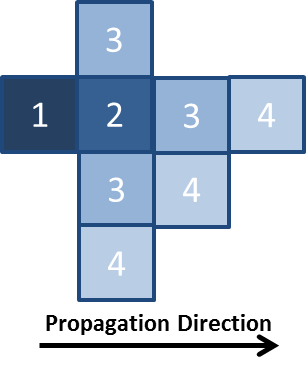
**Three-Phase 3D Reconstruction of LiCoO2 Cathode via FIB-SEM Tomography**

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**Figure S1.** Schematic view of path length ratio (PLR) method; (a) geometric definition of calculating the tortuosity τ via PLR method; (b) schematic of skeletonization process for the pore volume with nodes (blue dots) and channels (blue lines) are selected for calculations [[2](#_ENREF_2)]



**Figure S2.** Schematic view of distance propagation (DP) method with “city-block” as neighboring pixel definition [[1](#_ENREF_1)]

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**Figure S3.** 3D reconstruction rendering of electrolyte phase connectivity: percolated (green), unknown (yellow) and isolated (red)

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**Figure S4.** Comparison of distance propagation (DP) method and PLR method for the tortuosity of electrolyte and electrolyte plus carbon and binder phases; the DP method here use city-block as the neighboring definition

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**Figure S5.** (a) Three-dimensional distance map of electrolyte-plus-CB in the direction to the current collector (along X direction); (b) 2D Tortuosity distribution of electrolyte-plus-CB, respectively, at X = 34.5 µm; (c) Histogram of the tortuosity distribution of electrolyte-plus-CB;

**Table S1.** Tortuosity value of pore and pore-plus-CB

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | X | Y | Z | Average | PLR |
| Electrolyte | 1.90 | 1.66 | 1.99 | 1.85 | 2.01±0.29 |
| Electrolyte-plus-CB | 1.43 | 1.34 | 1.47 | 1.41 | 1.40±0.05 |

[1] Y.-c.K. Chen-Wiegart, R. DeMike, C. Erdonmez, K. Thornton, S.A. Barnett, J. Wang, Tortuosity characterization of 3D microstructure at nano-scale for energy storage and conversion materials, Journal of Power Sources, 249 (2014) 349-356.

[2] N.O. Shanti, V.W.L. Chan, S.R. Stock, F. De Carlo, K. Thornton, K.T. Faber, X-ray micro-computed tomography and tortuosity calculations of percolating pore networks, Acta Materialia, 71 (2014) 126-135.