Supplementary Material

Table 1S. All solid state thin film batteries fabricated over the last two decades

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| Cathode | Electrolyte | Anode | Thickness /Area | Capacity | At current density | Reversible capacity // after #cycles | Voltage range (V) | Deposition methodCath/Elec./And | Reference |
| LiCoO2 | Lipon | Li | 1 µm/1 cm2 | 64 µAh cm-2 µm -1 | 100 µA cm-2 | 62 µAh cm-2 µm -1 //4000 c | 3-4.2 | RF/RF/thermal | (Bates et al. 2000) |
| LiCoO2 | Lipon | Cu | 0.8 μm/ 1 cm2 | 59 µAh cm-2 µm -1 | 20 C | 47 µAh cm-2 µm -1// 1000 c | 3.0-4.2 | RF/RF/thermal | (Neudecker, Dudney, and Bates 2000) |
| LiCoO2 | Lipon | Li | 1.2 µm/ 1 cm2 | 170±10 mAh g-1 | 0.1 mA cm-2 | 98 % // 100 cycles | 3.0-4.4 | RF/RF/Thermal | (Jang et al. 2003) |
| LiCoO2 | Li1.9Si0.28P1.0O1.1N1.0 | Si0.7V0.3 | 0.17 µm / 1 cm2 | 56 µAh cm-2 µm -1 | 10 µA cm-2 | 48 µAh cm-2 µm -1 // 1500 c | 3.0-3.9 | RF/RF/RF | (S. J. Lee, Baik, and Lee 2003) |
| LiCoO2 | Li2.2V0.54Si0.46O3.4 | SnO | .4 µm /0.23 cm2 | 9.5 µAh cm-2 | 44 µA cm-2 | 45% //100 c | 0.7-3.3 | PLD/PLD/PLD | (Kuwata et al. 2004) |
| LiCoO2 | Lipon | Li | 350 nm / - | 60 µAh cm-2 µm -1 | 1 C | 87% // 100 c | 3-4.4 | RF/RF/thermal | (H. Y. Park et al. 2005) |
| LiCoO2 | Lipon | Li | 2.8–3.0 µm /4 cm2 | 39 µAh cm-2 µm -1 | 42 µA cm-2 (0.3 C) | 73 % // 1040 c | 3-4.2 | RF/RF/thermal | (Song et al. 2010) |
| LiCoO2 | Lipon | Li | 0.5 µm /- | 50 µAh cm-2 µm -1 | 10 µA cm-2 | Stable for 14 cycles | 3.0-4.2 | RF/RF/thermal | (Navone et al. 2011) |
| LiCoO2 | Lipon | Li | 3.7 µm /- | 106 µAh cm-2 | 46.5 µA cm-2 | 104 µAh cm-2 // 100c | 3-4.2 | RF/RF/thermal | (Koo et al. 2012) |
| LiCoO2 | LiBPON | Li | ~1 µm /- | 33.2 µAh cm-2 µm -1 | 10 µA cm-2 | 95.3% // 15 c | 3.4–4.2 | RF/RF/thermal | (Yoon et al. 2013) |
| LiCoO2 | Lipon | SnxNy | 3.4 µm /- | 188 µAh | 15 µA | Stable for 15 cycles | 2-4.2 | RF/RF/RF | (D. Li et al. 2014) |
| LiCoO2 | Lipon | Li | 450 nm /1.44 cm2 | 50 µAh cm-2 µm -1 | 10 µA cm-2 | 85% // 900 c | 3-4.2 | RF/RF/thermal | (Tintignac et al. 2014) |
| LiCoO2 | Lipon | Si/Cu | 0.3 µm /0.002 cm2 | 1st ~16 µAh cm-2 | 30 nA | ~15 µAh cm-2 // 100 c | 3-4.15 | RF/RF/RF | (Gong et al. 2015) |
| LiCoO2 | LiBON | Li | 1.7 µm / 3 cm2 | 49.2-44.2 µAh cm-2 | 83.7 µA cm-2 | 90% // 1000 c | 3.1-4.3 | RF-DC/RF/thermal | (Song, Lee, and Park 2016) |
| LiCoO2 | a-Li3PO4 | Li | 1.6 µm / 0.09 cm2 | 60 µAh cm-2 | 69 µA cm-2 | stable for 10 cycles | 3.0-4.4 | PLD/PLD/thermal | (Matsuda, Kuwata, and Kawamura 2018) |
| 6.7 µm /- | 240 µAh cm-2 | 10 µA cm-2 | - |
| LiCoO2 | Li-rich Lipon | Li | .45 µm /- | 64.5 µAh cm-2 µm -1 | 0.1 C | 63 µAh cm-2 µm -1 //30 c | 3.2-4.2 | RF/RF/thermal | (D. L. Xiao et al. 2018) |
| Lipon | 62.1 µAh cm-2 µm -1 | 0.1 C | 56 µAh cm-2 µm -1 //30 c |
| LiNiO2 | Lipon | Li | 1.13 µm / 1.44 cm2 | 65.3 µAh cm-2 µm -1 | 10 µA cm-2 | 57 µAh cm-2 µm -1 //120 c | 2.2-4.2 | RF/RF/Thermal | (Kim, Seong, and Yoon 2002) |
| LiMn2O4 | Lipon | Li | 0.3 µm /0.1 cm2 | 48 µAh cm-2 µm -1 | 100 µA cm-2 | 96% // 100 c | 3.7-4.3 | RF/RF/thermal | (Y. S. Park et al. 1999) |
| LiMn2O4 (2D) | Lipon | Li | 0.45 µm /- | 50.7 µAh cm-2 µm -1 | 148 mA g−1 | 73% // 500 c | 3.3-4.4 | DC/RF/thermal | (Xia et al. 2018) |
| LiMn2O4 (3D) | 53.8 µAh cm-2 µm -1 | 90% // 500 c |
| LixMnO2 (3D) | Lipon | Li | 1.7 µm /- | 37 µAh cm-2 | 40 µAh cm-2 | 81.3% // 1000 c | 2.0-4.3 | DC/RF/thermal | (Xia et al. 2020) |
| LiMn2O4 | Lipon | V2O5 | 0.8 µm / 1 cm2 | 18 µAh cm-2 | 2 µA cm-2 | 9 µAh cm-2 //20c | 0.3-3.5 | RF/RF/RF | (Baba et al. 2001) |
| Li2-xMn2O4 | Li3PO4−xNx | V2O5 | 0.8 μm/ 64 cm2 | 1.3 mAh | 0.4 mA | 0.9 mAh // 100 c | 0.3-3.5 | RF/RF/RF | (Nakazawa, Sano, and Baba 2005) |
| LixMn2O4 | Lipon | Li | 0.11 μm/ 0.2 cm2 | 79 µAh cm-2 µm -1 | 28 µA cm-2 | 78 µAh cm-2 µm -1// 300 c | 2.0 - 4.8 | RF/RF/thermal | (C. L. Li and Fu 2007) |
| Li2Mn2O4 | Li3PO4−xNx | Nb2O5 | 0.2 µm /10.24 cm2 | 1st ~500 mAh cm-3 | ~10 µA cm-2 | 400 mAh cm-3 // 500 c | 0.3-3.5 | RF/RF/RF | (Nakazawa et al. 2007) |
| Li2Mn2O4 | Li3PO4−xNx | LTO | 0.2 µm /10.24 cm2 | 1st ~40 µAh cm-2 µm -1 | 20 µA cm-2 | ~50 µAh cm-2 µm -1 //12000 c | 0.3-3.5 | RF/RF/RF | (Nakazawa et al. 2015) |
| LiNi1-xCoxO2 | Lipon | Li | ~0.6 µm /- | 60.2 µAh cm-2 µm -1 | 10 µA cm-2 | ~58 µAh cm-2 µm -1//100 c | 2.2-4.2 | RF/RF/thermal | (Kim et al. 2002) |
| LiyMnxNi2-xO4 | Lipon | Li | 30nm-130nm /3.481x10-3 cm2 | 52 µAh cm-2 µm -1 | 1 nA | Only 8 cycles | 3-4.7 | RF/RF/thermal | (Whitacre, West, and Ratnakumar 2003) |
| LiNi1-xCoxO2 | Lipon | Li | 300 nm /- | 60.2 µAh cm-2 µm -1 | 10 µA cm-2 | 90% // 100 c | 2.2–4.2 | RF/RF/thermal | (Kim, Seong, and Yoon 2004) |
| LiCo0:8Zr0:2O2 | Lipon | Li | 0.1μm/ - | 51 µAh cm-2 µm -1 | 14 µA cm-2 | 99% // 50 c | 3.0-4.2 | RF/RF/thermal | (C. Li, Liu, and Fu 2006) |
| LiCo0:8Ni0:2O2 | Lipon | Li | 0.1μm/ - | 62.6 µAh cm-2 µm -1 | 14 µA cm-2 | 87% // 50 c | 3.0-4.2 | RF/RF/thermal | (C. Li, Liu, and Fu 2006) |
| Li2CoMn3O8 | Lipon | Al | 500 nm /6.7 cm2 | 42 µAh cm-2 µm -1 | 5 µA | 29 µAh cm-2 µm -1// 5 c | 3-5V | E-beam/RF/RF | (Schwenzel, Thangadurai, and Weppner 2006) |
| Li2FeMn3O8 | 33 µAh cm-2 µm -1 | 26 µAh cm-2 µm -1// 5 c |
| LixMn2O4–0.5ZrO2 | Lipon | Li | 0.1 μm/ 0.2 cm2 | 62 µAh cm-2 µm -1 | 28 µA cm-2 | 53 µAh cm-2 µm -1// 300 c | 2.0-4.8 | RF/RF/thermal | (C. L. Li and Fu 2007) |
| LiNi0.8Co0.2O2 | Li3:4V0:6Si0:4O4 | SnO | 0.155 µm /0.23 cm2 | 19.2 µAh cm-2 | 13 µA cm-2 | 16.1 µAh cm-2 // 20c | 0-3.0 | PLD/PLD/PLD | (Baskaran et al. 2009) |
| Li(Ni1/4Mn1/2Co1/3)O2 | Lipon | Li | 0.15 μm/ - | 10.4 µAh cm-2 µm -1 | - | 67 %// 15 c | 3-5 | RF/RF/thermal | (Ding, Sun, and Fu 2010) |
| LiNi1/3Mn1/3Co1/3O2 | Lipon | TiO2 | 0.25 μm/ - | 52 µAh cm-2 µm -1 | 6 µA cm-2 | 47 µAh cm-2 µm -1// 400 c | 0-3.7 | RF/RF/RF | (Feng et al. 2014) |
| Li0.95Co0.31Ni0.34Mn0.33O2 | Li–Al–Ti–P–O–N | Li | 0.5 μm/ - | 171.5 mAh g-1 | 17 mA g-1 | 159.2 mAh g-1// 50 c | 2.8-4.5 | RF/RF/thermal | (Tan et al. 2014) |
| LiNi0.5Mn1.5O4 | Lipon | Li | 1 µm / - | 122 mAh g-1 | C/10 (14.8 mA g-1) | 90% // 10000 c | 3.5-5.1 | RF/RF/thermal | (J. Li et al. 2015) |
| V2O5 | Lipon | Li | 0.270 µm / 1.44 cm2 | 11.7 µAh cm-2 µm -1 | 20 µA cm-2 | * // 5c
 | 2.7-3.6 | DC/RF/thermal | (Jeon et al. 2001) |
| c-V2O5 | LiPON | Li | 1 µm/ 0.25 cm2 | 20 µAh cm-2 | 100 µA cm-2 | 25 µAh cm-2 // 100 c | 2.15-3.8 | RF/RF/thermal | (Navone et al. 2009) |
| V2O5-x | Lipon/Al2O3(1 nm) | Li | 1 µm / - | 32.74 µAh cm-2 µm -1 | 14.6 µA cm-2 | 29.78 µAh cm-2 µm -1// 1000 c | 2.15-3.8 | RF/RF/thermal | (C. Xiao et al. 2021) |
| Li2Ag0.5V2O5 | Lipon | Li | -/- | 60 µAh cm-2 µm -1 | 7 µA cm-2 | ~41 µAh cm-2 µm -1 // 40 c | 1-3.5 | PLD/PLA/thermal | (Feng Huang, Fu, and Qin 2003) |
| Ag 0.5:V2O5 | Lipon | Li | 0.100 µm /- | 70 µAh cm-2 µm -1 | 7 µA cm-2 | 42-55 µAh cm-2 µm-1/ 20 c | 1-3.5 | PLD/e-beam/thermal | (F. Huang et al. 2004) |
| Ag 0.8:V2O5 | Lipon | Li | 0.4 µm /- | 78 µAh cm-2 µm -1 | 20 µA cm-2 | 73.6 µAh cm-2 µm -1 // 200 c | 1.5-3.6  | DC/RF/thermal  | (J. M. Lee et al. 2004) |
| MoO3 | LiO–V2O5 –SiO2 | Li | 4.66 µm /0.49 cm2 | 62 µAh cm-2 µm -1 | 10 µA cm-2 | 289 µAh cm-2 // 21c | 1.5-3.5 | RF/RF/thermal | (Ohtsuka and Sakurai 2001) |
| MoO3 | Lipon | Li | 0.2 µm/ 0.79 cm2 | 71.7 µAh cm-2 µm -1 | 202.5 µA cm-2 | 62 µAh cm-2 // 550 c | 1-3.5 | RF/RF/thermal | (Glenneberg et al. 2016) |
| MOx (2D) | LiPON | Li | 540 nm /- | 90 mAh g-1 | 500 mA g-1 | 76% // 1000 c | 1.5-3.5 | DC/RF/thermal | (Sun et al. 2019) |
| MOx (3D) | 1.2 µm /- | 145 mAh g-1 | 92.7% // 1000 c |
| TiOySz | LiPONB | Li | 1.2 µm / 25 mm2 | 90 µAh cm-2 µm -1 | 100 µA cm-2 | 89% // 500 c | 1-3 | DC/RF/thermal | (Fleutot et al. 2011) |
| FeS2 | Lipon | Li | 0.365 µm / 25 mm2 | ~830 mAh g-1 | 100 µA cm-2 | 97.5% // 500 c | 0.5-3.5 | RF/RF/thermal | (Pelé et al. 2015) |
| Li1.2TiO0.5S2.1 | Lipon | Si | ~1 µm / 8.7 mm2 | 61 µAh cm-2 µm -1 | 2 µA cm-2 | 42 µAh cm-2 µm -1 //1200c | 0.5-3.2 | RF/RF/DC | (Cras et al. 2015) |
| Li1.2TiO0.5S2.1 | Lipon | Li | 1.07 µm / 25 mm2 | 85 µAh cm-2 µm -1 | 2 µA cm-2 | 75 µAh cm-2 µm -1 // 1200 c | 1.5 – 3.2 | RF/RF/thermal | (Dubois et al. 2017) |
| LiCoPO4 | Lipon | Li | 0.285 µm / 0.48 cm2 | 11 µAh cm-2 µm -1 | C/15 | 86% // 100 c | 3.5-5.2 | RF/RF/thermal | (West, Whitacre, and Ratnakumar 2003) |
| FePO4 | Lipon | Li | 0.05 µm / - | 18.5 μAh//~13 μAh// | 28 µA cm-2 | 21 µAh cm-2 µm -1 //100 c | 2.0-4.0 | RF/RF/thermal | (C.-L. Li, Zhang, and Fu 2006) |
| FePON | Lipon | Li | 0.05 µm /- | 63. µAh cm-2 µm -1 | 28 µA cm-2 | 72 % // 90 c | 2.0-4.0 | RF/RF/thermal | (C.-L. Li, Zhang, and Fu 2006) |
| CuWO4 | Lipon | Li | 0.25 μm / - | 70 µAh cm-2 µm -1 | 14 µA cm-2 | 26 µAh cm-2 µm -1 // 100c | 1.0-4.0 | RF/RF/thermal | (C. L. Li and Fu 2008b) |
| LiFe(WO4)2 | Lipon | Li | 0.3 μm / - | 104 µAh cm-2 µm -1 | 28 µA cm-2 | 56 µAh cm-2 µm -1 // 150c | 1.0-4.0 | RF/RF/thermal | (C. L. Li and Fu 2008a) |
| Bi2WO6 | Lipon | Li | 0.2 μm / - | 15 µAh cm-2 µm -1 | 28 µA cm-2 | -//- | 1.5-4 | RF/RF/thermal | (C. L. Li et al. 2009) |