Ultrathin surface modification by atomic layer deposition on high voltage cathode $LiNi_{0.5}Mn_{1.5}O_4$ for lithium ion batteries-supporting information

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Figure S1

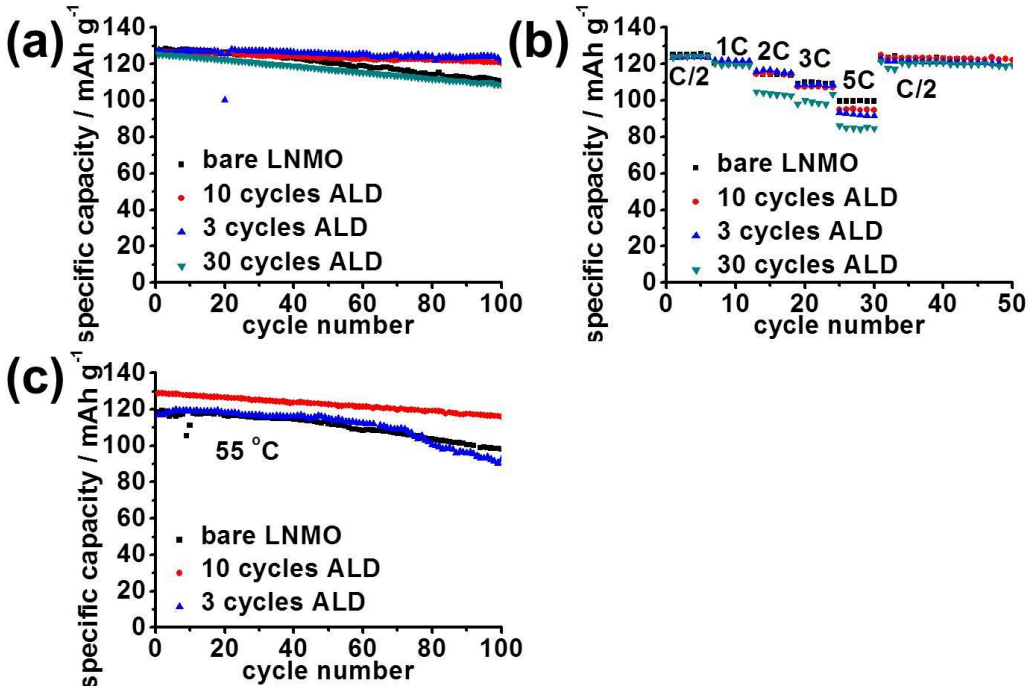

Figure S1 Comparison of the effect from different number of ALD cycles. (a) room temperature cycling performance at C/2; (b) room temperature performance at different current rate; (c) high temperature (55 ℃) cycling performance at C/2.

According to literature, once the coating thickness exceeds a threshold value, the

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electrochemical stability will be affected by the kinetics associated with ion and electron transportation. The maximum allowed thickness can be different for different materials. In our home-made ALD system, we tested 3, 10 and 30 cycles ALD Al_2O_3 coating to find out the optimized condition. The comparison is shown in Figure S1. 3 and 10 cycles ALD coating showed similar improvement while 30 cycles cannot improve the battery performance at room temperature test (Figure S1a and S1b). Further test of 3 and 10 cycles ALD coating at elevated temperature of 55 ℃ showed clear improvement from 10 cycles ALD coating (Figure S1c), hence we believe 10 cycles ALD coating can give us optimized thickness in our home-made ALD system.