Electronic Supplementary Material (ESI) for Nanoscale Advances.

SUPPLEMENTARY INFORMATION

CO_2-based atomic/molecular layer deposition of lithium ethylene carbonate thin films

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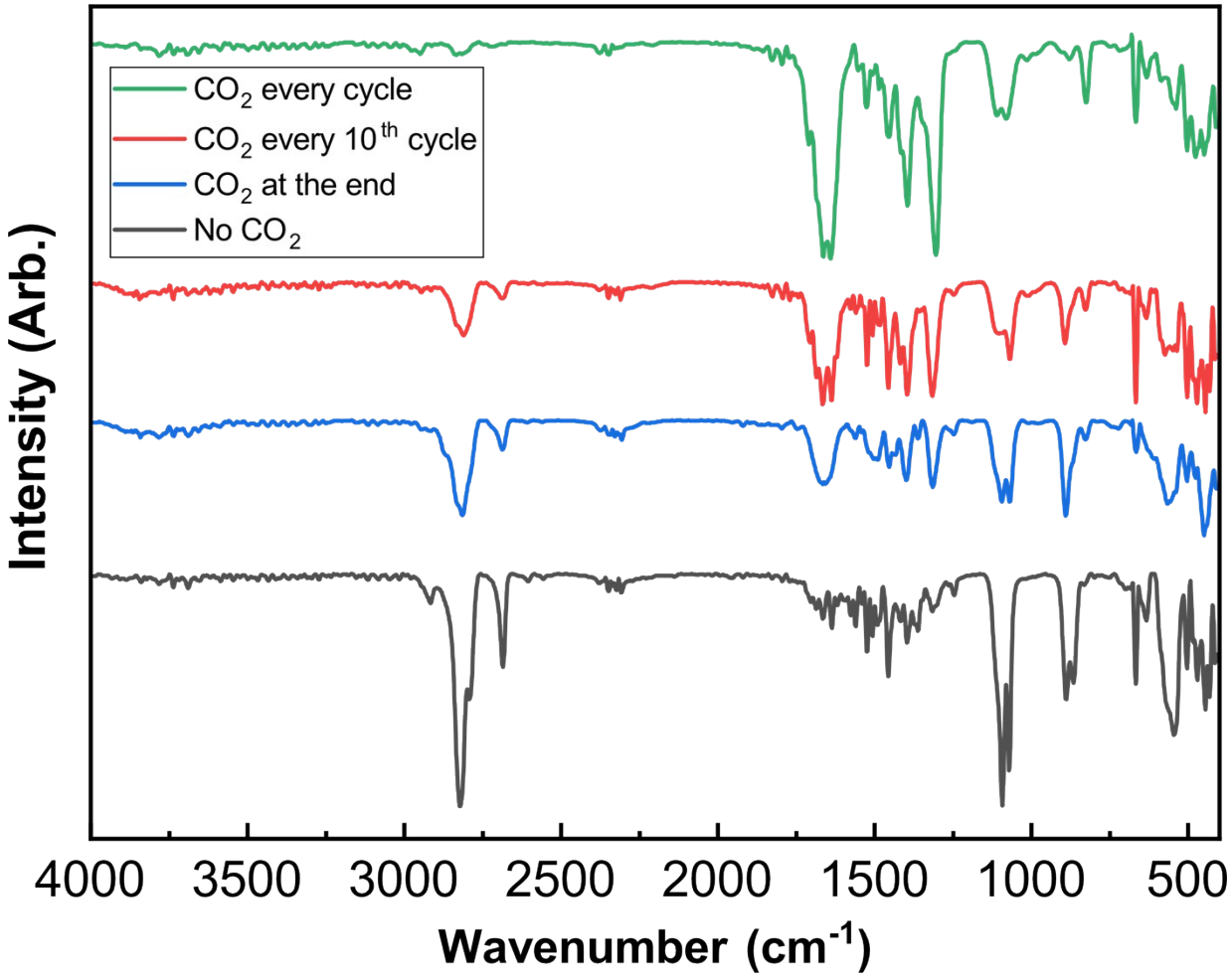


Fig. S1. Observed changes in the FTIR of LiEGCO films deposited on Si when the CO_2 was pulsed more frequently.

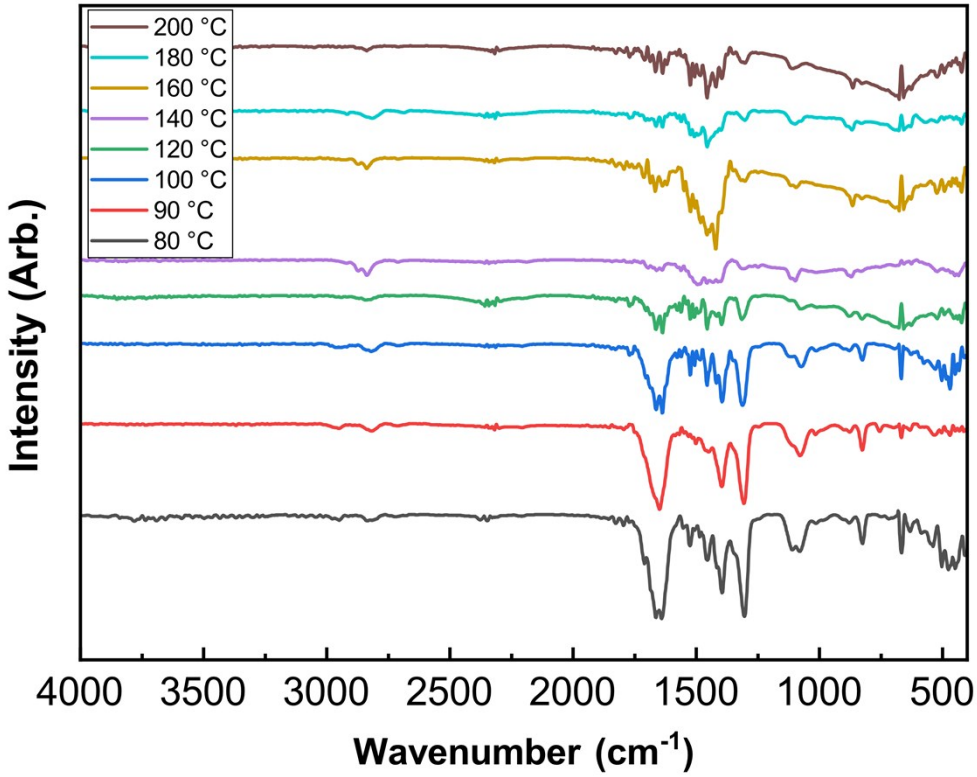
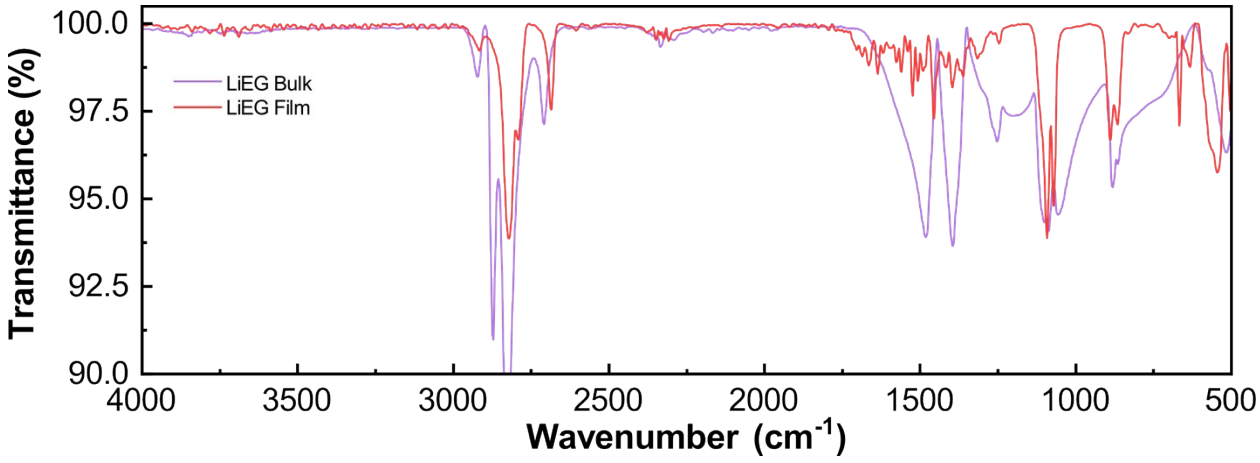


Fig. S2. Change in the FTIR spectra of LiEGCO films deposited on Si with increasing deposition temperature.

Fig. S3. Comparision between transmission IR spectrum from LiEG film films deposited on Si and ATR-FTIR spectrum of synthetized powder LiEG.



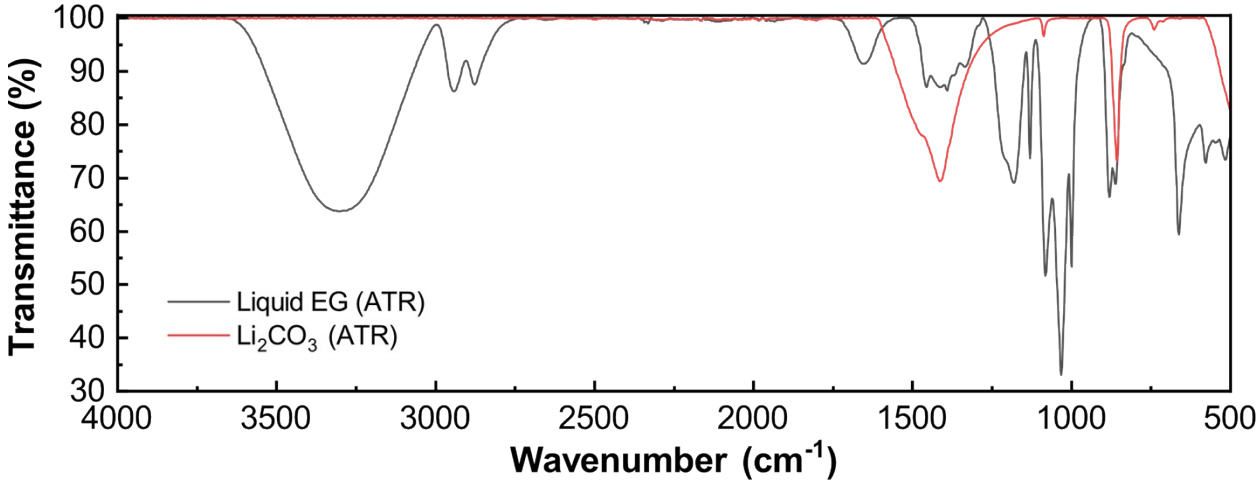


Fig. S4. ATR-FTIR spectra of EG liquid (black) and Li_2CO_3 powder (red).

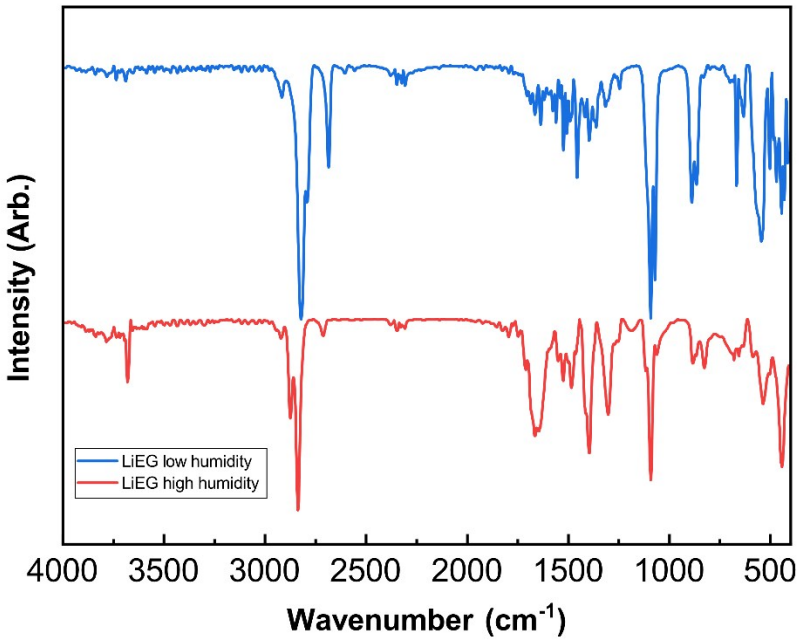


Fig. S5. Comparision between LiEG films on Si spectrum measured during low ambient humidity (blue), high ambient humidity (red).

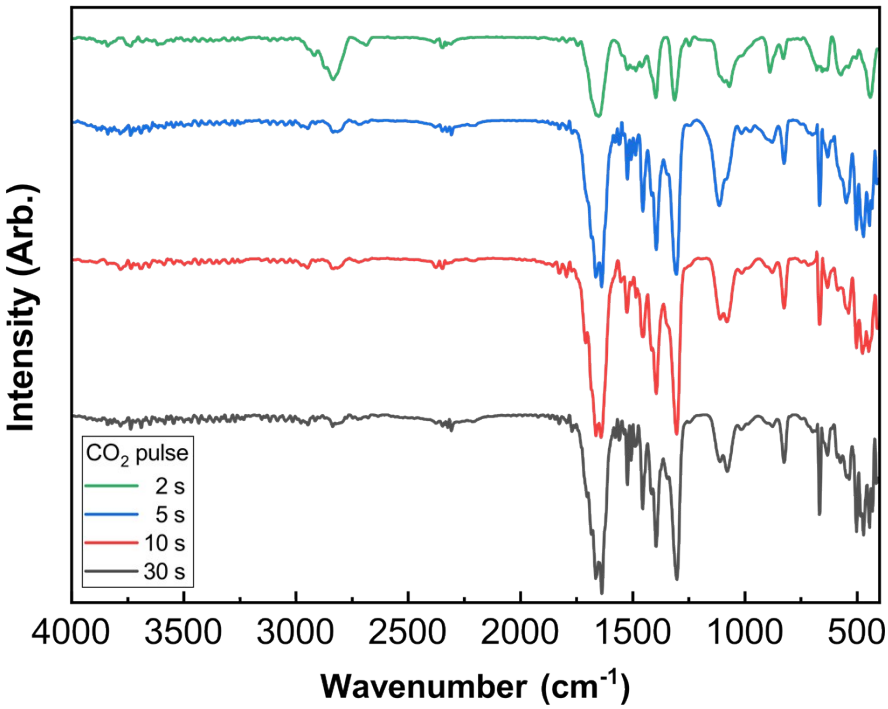


Fig. S6. Change in the LiEGCO films deposited on Si spectra with the function of CO_2 pulse.

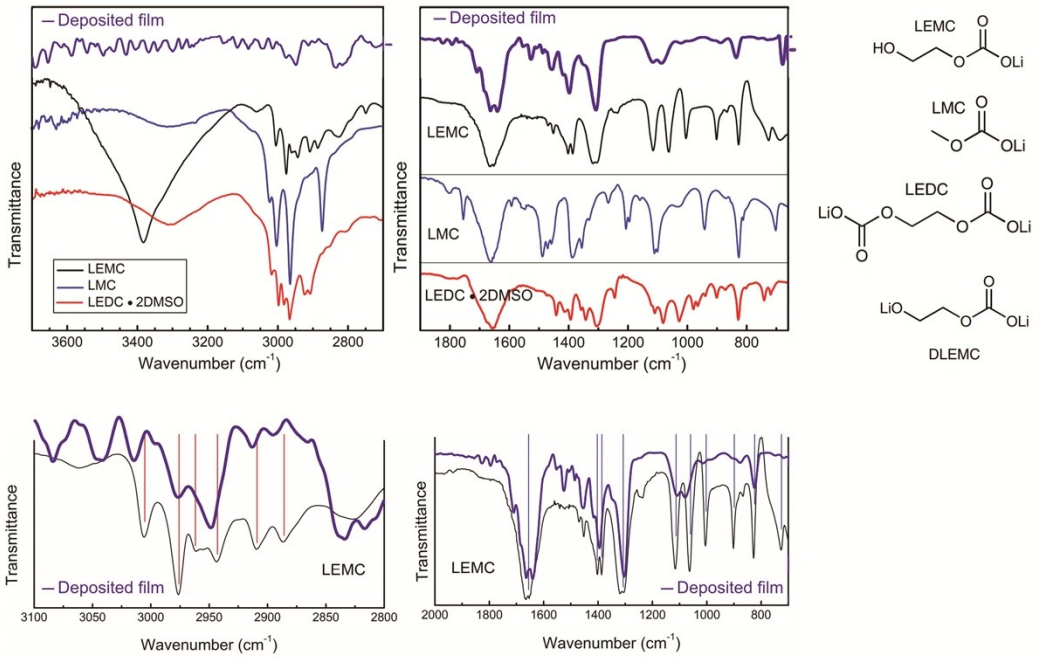


Fig. S7. Comparison between the deposit film and the FTIR spectra of the bulk materials from ref.[1].

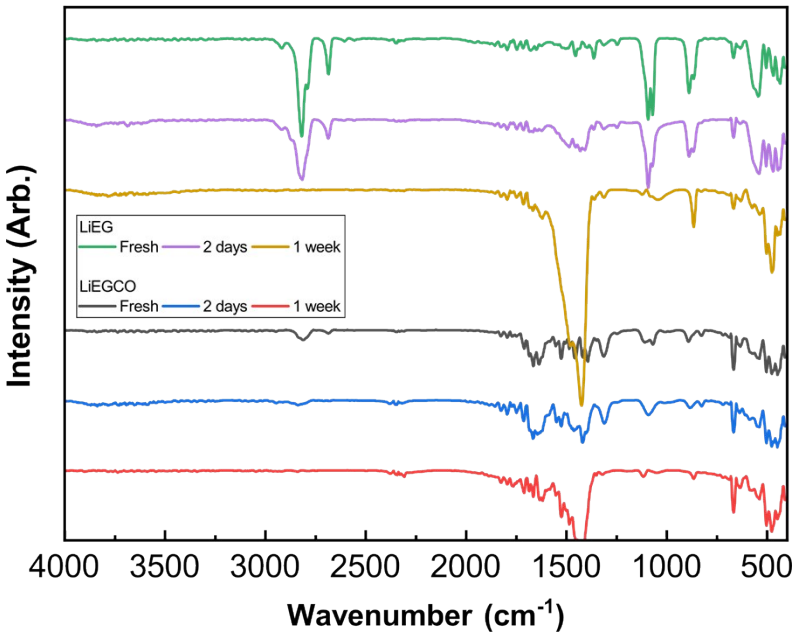


Fig. S8. Stability of the films deposited on Si when storing in laboratory conditions. The experiments were done during winter time when humidity was much lower than during summer.

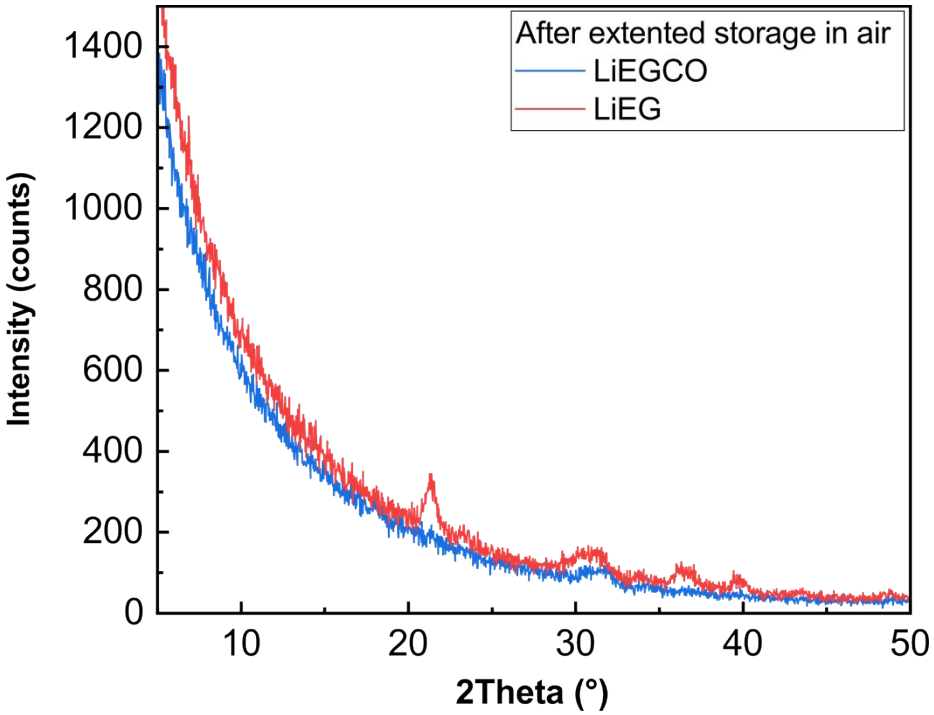


Fig. S9. GIXRD measurement of both of the films deposited on Si after extended storage in laboratory air.

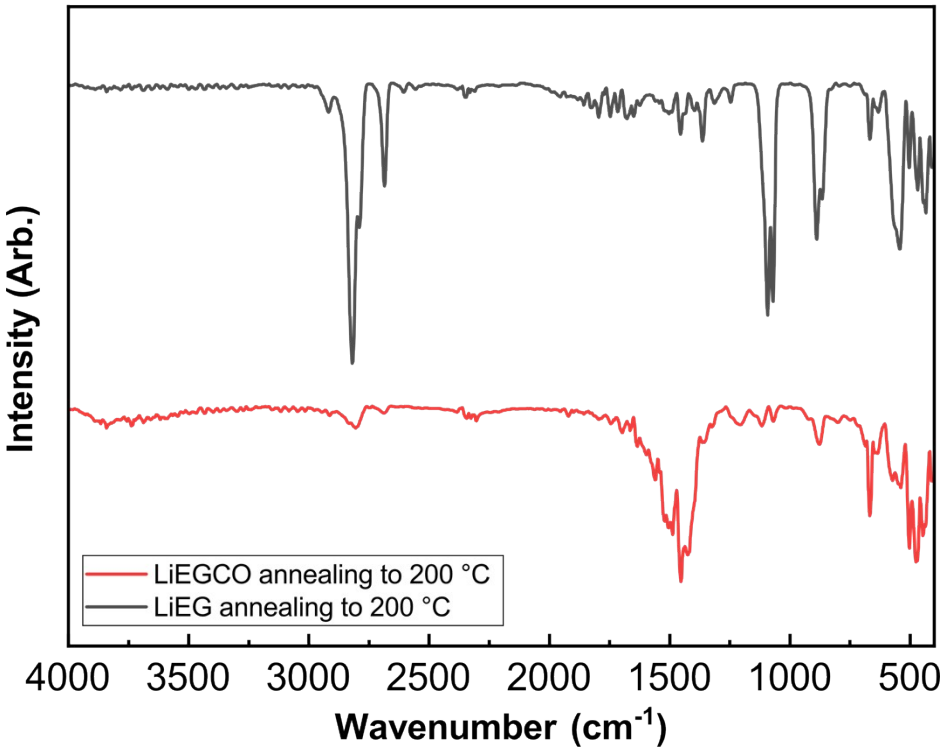


Fig. S10 LiEGCO and LiEG films deposited on Si annealed to 200 °C.

REFERENCES

1 L. Wang, A. Menakath, F. Han, Y. Wang, P. Y. Zavalij, K. J. Gaskell, O. Borodin, D. Iuga, S. P. Brown, C. Wang, K. Xu and B. W. Eichhorn, *Nat. Chem.*, 2019, **11**, 789–796.