Supporting Information

Regeneration of Spent Graphite from Lithium-Ion Batteries by Malic Acid Leaching and Alkaline EDTA Chelation

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Table S1. Numerical inductively coupled plasma mass spectrometry (ICP–MS) results (parts per million (ppm)) for Li, Al, P, Mn, Fe, Co, Ni, and Cu in spent graphite (SG), malic-acid-treated graphite (MG), ethylenediaminetetraacetic acid (EDTA)-treated graphite (EG), and commercial graphite (CG).

	Element / ppm								
Sample	**Li**	**Al**	**P**	**Mn**	**Fe**	**Co**	**Ni**	**Cu**	**Total**
SG	29.20	14.83	4.84	20.62	2.70	22.98	122.02	0.66	217.85
MG	0.28	0.22	0.62	0.02	0.50	0.05	0.00	0.13	1.82
EG	0.32	0.22	0.80	0.03	0.22	0.04	0.00	0.10	1.73
CG	0.12	0.00	0.00	0.00	0.39	0.04	0.12	0.35	1.02

Table S2. Summary of initial discharge capacity, initial Coulombic efficiency, and 100-cycle capacity retention for SG, MG, EG, CG, MG-H, and EG-H. MG-H and EG-H denote MG and EG after the 1200 °C heat-treatment step.

Sample	Initial discharge capacity / mAh g^{-1}	Initial Coulombic efficiency / %	Capacity retention / %
SG	276	89	33
MG	350	90	47
EG	346	90	68
CG	365	92	87
MG-H	362	92	70
EG-H	365	92	87

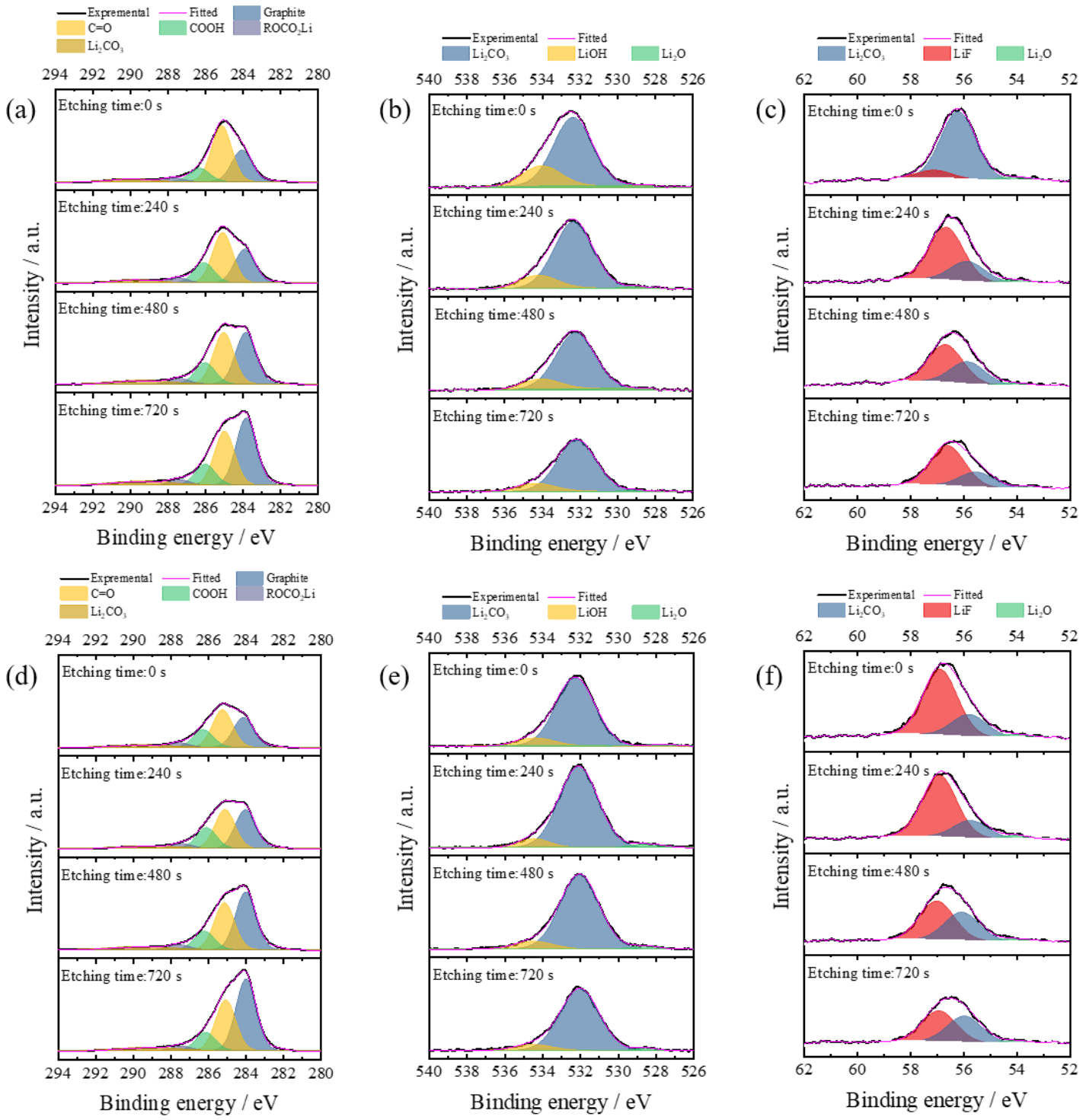


Figure S1. Representative peak fitting of C 1s, O 1s, and Li 1s X-ray photoelectron spectroscopy (XPS) spectra acquired at different Ar+ sputter-etching times for (a–c) MG and (d–f) EG.

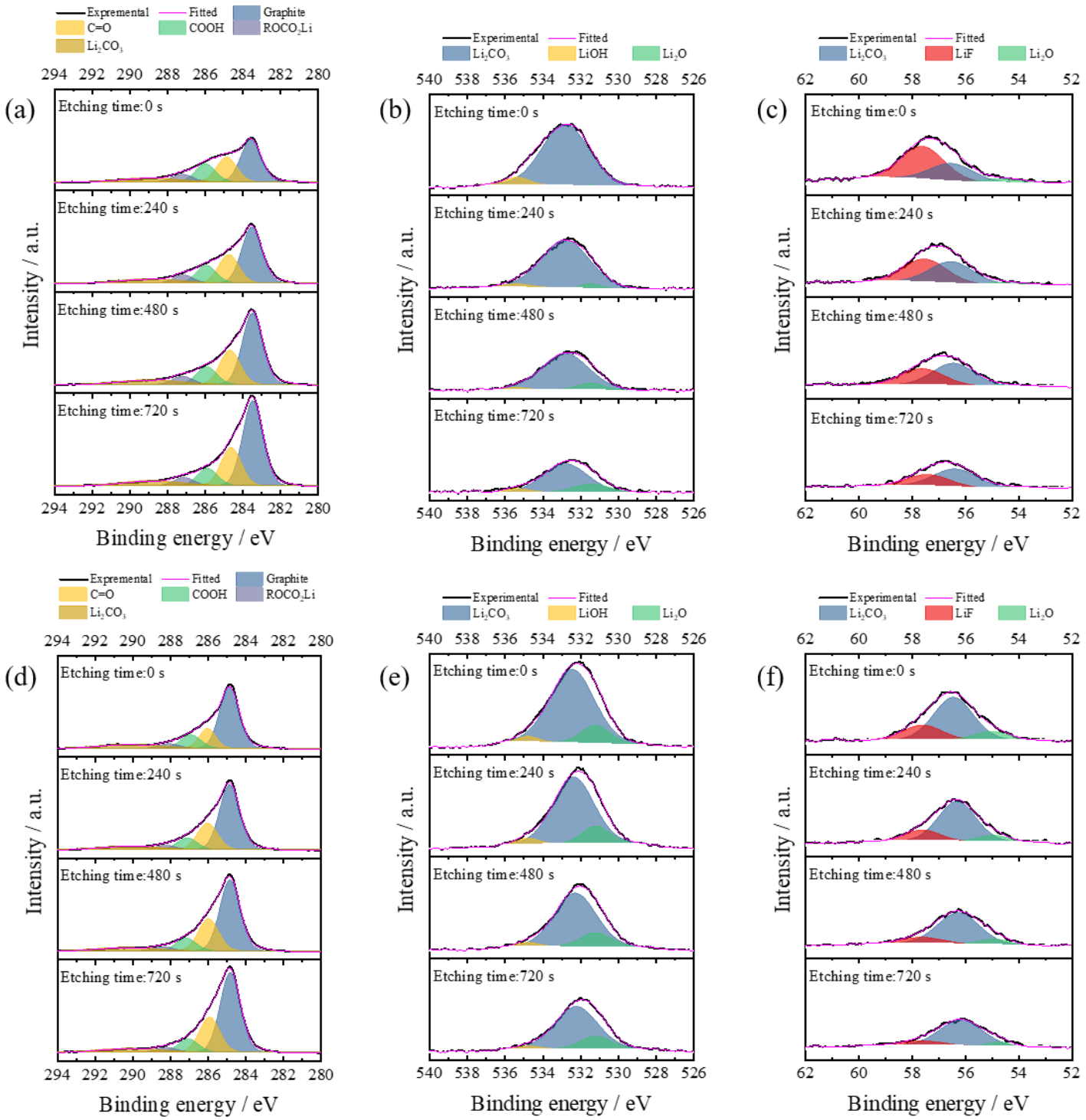


Figure S2. Representative peak fitting of C 1s, O 1s, and Li 1s XPS spectra acquired at different Ar+ sputter-etching times for (a–c) MG-H and (d–f) EG-H.