Supplementary Information (SI) for Environmental Science: Advances.

Comparative Analysis of Systematic Variations in Life Cycle Analysis of Lithium-ion Batteries for Automotive Applications

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Table S1. List of reviewed literature with the referenced battery chemistry for which the information was taken from that paper. The electricity mix location/region considered along with the assumed reference year for LCA calculation is also mentioned.

Reference	Battery chemistry	Electricity mix location/region	Reference year used for LCA calculation
[1]	NMC111, NMC811, LFP	China	2024
[2]	NMC111, NMC622	Italy	2024
[3]	NMC111	Asia	2024
[4]	NMC111	United States	2023
[5]	NMC111, NMC532, NMC622, NMC811, LFP	Global	2023
[6]	NMC111, NMC532, NMC622, NMC811, LFP	Global	2023
[7]	NMC532	United States	2023
[8]	NMC622	Europe, Sweden	2023
[9]	NMC811	Global	2023
[10]	NMC111	Europe	2022
[11]	NMC111	China	2022
[12]	NMC111, NMC622, LFP	China	2022
[13]	NMC111	China	2022
[14]	NMC111, NMC532, NMC622, NMC811	United States	2022
[15]	NMC111, NMC622, NMC811	China	2022
[16]	NMC811	Europe	2022
[17]	NMC111	Thailand	2021
[18]	NMC111, NMC622, NMC811	Global	2021
[19]	NMC111	China	2021
[20]	NMC111	United States	2021
[21]	NMC111	Global	2021
[22]	NMC111	China	2021
[23]	NMC111	China	2020
[24]	NMC111	United States	2020
[25]	NMC111	United States	2020
[26]	NMC111	Europe	2020
[27]	NMC532	United States	2020
[28]	NMC622	China	2020
[29]	NMC811	Not Specified	2020
[30]	NMC111, NMC622, LFP	United States	2019
[31]	NMC111	Global	2019
[32]	NMC111	United States	2019
[33]	NMC111, NMC622	Global	2019
[34]	NMC111	China	2019
[35]	LFP	China, Europe	2019
[36]	NMC111	Europe	2018
[37]	NMC111	Europe	2018
[38]	NMC111	China	2018
[39]	NMC111	China	2017
[40]	NMC111	United States	2017
[41]	NMC111	Western Europe	2017
[42]	LFP	China	2017
[43]	NMC111	China	2016
[44]	NMC111	China	2016
[45]	NMC111	United States	2016
[46]	NMC111	China	2016
[47]	NMC111	China	2016
[48]	NMC111	Europe	2016
[49]	LFP	Europe	2016
[50]	NMC111	United States	2015
[51]	NMC111	China	2015
[52]	LFP	United States	2015

Table S2. The bill of materials for the size battery chemistries referenced in this work.[53,54]

	NMC111	NMC532	NMC622	NMC811	NMC95	LFP
Cathode Active Material	27.7%	26.6%	26.3%	24.8%	23.9%	27.6%
Graphite	15.6%	16.3%	16.5%	17.4%	18.0%	14.2%
Binder	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
Copper	8.1%	7.9%	7.9%	7.7%	7.6%	10.1%
Aluminum Sheet	12.0%	12.0%	12.1%	12.1%	12.1%	12.5%
Electrolyte: LiPF6	1.1%	1.1%	1.1%	1.1%	1.1%	1.3%
Electrolyte: Ethylene Carbonate	3.1%	3.0%	3.0%	3.0%	3.0%	3.5%
Electrolyte: Dimethyl Carbonate	3.1%	3.0%	3.0%	3.0%	3.0%	3.5%
Plastic: Polypropylene	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Plastic: Polyethylene	0.7%	0.7%	0.7%	0.6%	0.6%	1.1%
Plastic: Polymer	0.9%	0.9%	0.9%	0.9%	0.9%	0.8%
Plastic: Polyethylene Terephthalate	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Steel	15.3%	15.6%	15.8%	16.2%	16.5%	13.7%
Stainless Steel	6.2%	6.3%	6.4%	6.5%	6.6%	5.8%
Thermal Insulation	0.4%	0.4%	0.4%	0.4%	0.4%	0.3%
Coolant: Glycol	4.0%	4.0%	4.1%	4.1%	4.2%	3.7%
Electronic Parts	0.8%	0.9%	0.9%	0.9%	1.0%	0.7%

Table S3. The bill of materials for NMC111 battery in GREET 2018 model[55] and R&D GREET 2024 model[56] versions.

	GREET 2018	R&D GREET 2024
Cathode Active Material	25.2%	27.7%
Graphite	15.7%	15.6%
Binder	2.2%	0.9%
Copper	11.7%	8.1%
Aluminum Sheet	0.0%	12.0%
Wrought Aluminum	23.9%	0.0%
Electrolyte: LiPF6	1.6%	1.1%
Electrolyte: Ethylene Carbonate	4.5%	3.1%
Electrolyte: Dimethyl Carbonate	4.5%	3.1%
Plastic: Polypropylene	1.1%	0.1%
Plastic: Polyethylene	0.4%	0.7%
Plastic: Polymer	0.0%	0.9%
Plastic: Polyethylene Terephthalate	0.2%	0.2%
Steel	0.6%	15.3%
Stainless Steel	0.0%	6.2%
Thermal Insulation	0.5%	0.4%
Coolant: Glycol	4.3%	4.0%
Electronic Parts	3.7%	0.8%

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