

Appendix A. USABC Active Material Performance Targets

USABC Goals for Active Materials for Cells to be Used in Automotive Traction Applications

| Level | EOL @ 30°C Parameter ¹ | Unit | Cathode | Anode | Test Method |
|-------------------|-----------------------------------|-------------------------|---------|--------|----------------------------------------------|
| Material | Specific Capacity | mAh/g | > 250 | > 2000 | C/3 CC-CV Charge, C/3 CC Discharge |
| | Capacity Density | mAh/cc | > 675 | > 3600 | |
| | Nominal Voltage | V vs Li/Li ⁺ | > 4.3 | < 1.0 | |
| | Irreversible Capacity Loss | % | < 10 | < 10 | |
| | Coating Level | mAh/cm ² | > 5 | > 5 | |
| | High Rate Charge | mA/g | > 800 | > 6400 | 80% U.E. ⁴ in 15 min |
| | Peak Specific Discharge | mA/g | > 500 | > 4000 | 30 Sec Dis (EV Goals) |
| | Cost ² | \$/kg | < 10 | < 5 | 3500 MT/yr (Anode), 28000 MT/yr (Cathode) |
| Cell ³ | Swelling | % | < 5 | < 10 | EV Test Manual |
| | Pressure | MPa | < 2 | < 2 | EV Test Manual |
| | Calendar Life | Years | > 15 | > 15 | EV Goals |
| | Cycle Life | Cycles | > 1000 | > 1000 | DST |

1. The values in this table represent performance of the complete electrode (including all active and inactive materials) in a full cell environment at end of life.
2. Active material cost only, based on US production, meeting IRA requirements.
3. 5 Ah or more.
4. The definition of useable energy (U.E.) can be found in the "USABC Battery Test Manual for Electric Vehicles" on the USABC website.