Supplementary Material

Table S 1 Material Inventory

| **Material/ Process** | **PEFCR Geographical reference** | **PEFCR Dataset name** | **Dataset used** | **Year** | **Unit (output)** | **Value** | **related process** |
| --- | --- | --- | --- | --- | --- | --- | --- |
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| Electrode General |  |  |  |  |  |  |  |
| Polycarbonate | EU-28+EFTA | Polycarbonate granulate (PC) | GaBi ts | 2018 | mg | 2 | Polycarbonate (PC) granulate, production mix, at plant, Technology mix, dipenyl carbonate route and phosgene route, 1.20–1.22 g/cm3 |
| Polyvinyl Fluoride | WORLD | Polyvinyl Fluoride | Gabi ts | 2018 | mg | 2 | Polyvinyl fluoride, production mix, at plant, polymerisation of vinyl fluoride, 1.77 g/cm3 |
| Copper | EU-28+EFTA | Copper Sheet | Gabi ts | 2018 | mg | 10 | Copper sheet, single route, at plant, melting and mechanical treatment (fabrication), 8.92 g/cm3 |
| Alcohol | EUR | Alcohol ether sulphate (petro based) | ecoinvent 3.2 | 2015 | mg | 1.7 | Alcohol ether sulphate (petro based) production, production mix, at plant, technology mix, 100% active substance |
| Hydrogen Fluoride | EUR | Hydrogen Fluoride | ecoinvent 3.2 | 2015 | mg | 1.7 | hydrogen fluoride production, production mix, at plant, technology mix, 100% active substance |
| Chlorine Dioxide | GLO | Chlorine Dioxide | ecoinvent 3.2 | 2015 | mg | 1.7 | chlorine dioxide production, production mix, at plant, technology mix, 100% active substance |
| Tetrafluoroethane | GLO | Tetrafluoroethane | ecoinvent 3.2 | 2015 | mg | 1.7 | tetrafluoroethane production, production mix, at plant, technology mix, 100% active substance |
| Carbon Black | RER | Carbon black, general purposes | ecoinvent 3.2 | 2015 | mg | 6.8 | Carbon black, general purposes production, production mix, at plant, technology mix, 100% active substance |
| Propanol | EUR | isopropanol | ecoinvent 3.2 | 2015 | mg | 357 | isopropanol production, production mix, at plant, technology mix, 100% active substance |
| Positive Electrode |  |  |  |  |  |  |  |
| Ferrous Chloride | EUR | Iron chloride | ecoinvent 3.2 | 2015 | mg | 2 | Iron (II) chloride production, production mix, at plant, technology mix, 100% active substance |
| Hydrogen Cyanide | N/A | Hydrogen Cyanide | N/A | N/A | mg | 2 | could only be modelled as am emission so production not taken into account |
| Potassium carbonate | EUR | Potassium carbonate | ecoinvent 3.2 | 2015 | mg | 2 | potassium carbonate production, production mix, at plant, technology mix, 100% active substance |
| Calcium hydroxide | EUR | Calcium hydroxide | ecoinvent 3.2 | 2015 | mg | 2 | Calcium hydroxide production, production mix, at plant, technology mix, 100% active substance |
| Chlorine | N/A | Chlorine | N/A | N/A | mg | 2 | could only be modelled as am emission so production not taken into account |
| Copper | EU+EFTA | Copper mix, primary+secondary, from CFF | PEFCR | 2019 | mg | 9 | CFF Copper - LCI |
| Nitric Acid | EUR | Nitric Acid | ecoinvent 3.2 | 2015 | mg | 9 | Nitric acid production, production mix, at plant, technology mix, 100% active substance |
| Negative Electrode |  |  |  |  |  |  |  |
| TiO2 | EUR | titanium dioxide | ecoinvent 3.2 | 2015 | mg | 75.45 | titanium dioxide production, production mix, at plant, technology mix, 100% active substance |
| Electrolyte |  |  |  |  |  |  |  |
| AlCl3 | GLO | Aluminium Chloride | ecoinvent 3.2 | 2015 | mg | 5 | aluminium chloride production, production mix, at plant, technology mix, 100% active substance |
| KCL | EU-28+3 | Potassium chloride\_as K2O\_at plant\_EU-28+3\_S | Quantis | 2015 | mg | 5 | Potassium chloride, at plant, as K2O, per kg K2O |
| deionised water | EUR | deionised water | ecoinvent 3.2 | 2015 | mg | 50 | De-ionised water production, production mix, at plant, technology mix, 100% active substance |
| Battery Casing |  |  |  |  |  |  |  |
| Plastic casing | EU-28 | Plastic granulate (unspecifiec) | GaBi ts | 2012 | mg | 60 | Plastic granulate secondary (low metal contamination), production mix, at plant, from post-consumer plastic waste, via grinding, metal separation, washing, pelletization, plastic waste with low metal fraction |
| Charger |  |  |  |  |  |  |  |
| Charger | GLO | Charger EPTA | Recharge/ts | 2010-2012 | mg | 1.49E-04 | taken from reference |
| Manufacturing |  |  |  |  |  |  |  |
| Power\_electrode | EU-27 | Electricity grid mix | GaBi 6 ts | 2011 | MJ | 1.01E-02 | taken from reference |
| Power\_cell forming | EU-27 | Electricity grid mix |  |  | MJ | 3.04E-04 | taken from reference |
| Power\_battery assembly | EU-27 | Electricity grid mix |  |  | MJ | 2.53E-07 | taken from reference |
| Water | EU-27 | Tap water | GaBi 6 ts | 2012 | kg | 2.78E-03 | taken from reference |
| Auxiliary materials | DE | Hydrochloric acid mix (100%) | GaBi 6 ts | 2012 | kg | 1.15E-04 | taken from reference |
| EU-27 | Nitric acid (98%) | GaBi 6 ts | 2012 | kg | 0.00E+00 | taken from reference |
| EU-27 | Water (deionised) | GaBi 6 ts | 2012 | kg | 0.00E+00 | taken from reference |
| Waste water treatment | EU-27 | Municipal waste water treatment (sludge incineration) | GaBi 6 ts | 2012 | kg | 2.99E-03 | taken from reference |
| Transport |  |  |  |  |  |  |  |
| Land Transport | EU-28+3 | Transport | GaBi ts | 2012 | kg\*km | 0.1966 | Articulated lorry transport, Euro 4, Total weight >32 t (without fuel), consumption mix, to consumer, diesel driven, Euro 4, cargo, more than 32t gross weight / 24,7t payload capacity |
| Sea Transport | EU-28+3 | Transport | GaBi ts | 2012 | kg\*km | 1.00831 | Barge, consumption mix, to consumer, technology mix, diesel driven, cargo, 1500 t payload capacity - ROW w/o EU-28+3 |