

# Battery Research Reagents



LiB  
RFB

Battery Electrolytes

Organic Solvents

Battery Additives

Organic Redox Flow Battery Materials

# Battery Research Reagents

Secondary batteries are rechargeable. There are small types of secondary batteries obtained from nickel-cadmium, nickel-hydrogen, and lithium ion sources. It is known that lead-acid batteries are relatively large. Secondary batteries are useful for automobiles, airplanes, agricultural equipment, electric vehicles, computers, mobile phones and so on. Among them, the lithium ion batteries are mainly used for various applications, and are manufactured by lithium cobalt oxide (anode), graphite (cathode), and a liquid electrolyte with organic components.<sup>1)</sup> The lithium ion batteries provide high voltage and energy density, because the lithium ion supplied from the lithium cobalt oxide is a carrier performing the charge/discharge of the battery. A memory effect hardly occurs. A package of the lithium ion batteries can be compact. Further development of a better secondary battery is also in progress towards a low-carbon society as well as energy security.

In order to improve security of the lithium ion batteries, it is expected to use an ionic liquid electrolyte,<sup>2)</sup> phosphate-based organic solvent,<sup>3)</sup> an organic and inorganic solid electrolyte, since an organic electrolyte solution is more or less flammable. An electrolyte solution requires a fluorine-containing flame retardant as an additive.<sup>4)</sup> A selection of electrolyte is important for input-output characteristics, lifetime, security and voltage of a secondary battery. It is also expected that the electrolyte shows high lithium ion conductivity, both electrical and chemical stability, and a low environmental load.

A next generation secondary battery with high energy density must be developed well. Among them, we may expect practical use of a secondary battery based on a multivalent ion carrier that can transport multi-electrons. A magnesium-based secondary battery has a theoretically high energy density. Furthermore, it is expected that one can use abundant magnesium for the battery and it is secure to use.<sup>5)</sup>

Redox flow battery (RFB) is developed for application of scalable stationary batteries, and one can expect that they are promising energy storage system for a smart grid that balance power supply and demand. Organic RFB which is fabricated by organic-based redox active electrolytes, has received good attention as they are potentially much less expensive than their vanadium-based flow batteries.<sup>6-8)</sup>

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## References

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## Battery Electrolytes

L0146 25g 100g



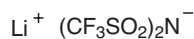
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L0204 25g 300g



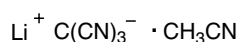
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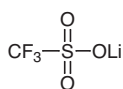
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L0308 1g 5g



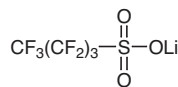
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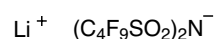
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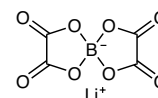
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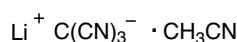
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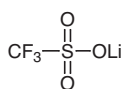
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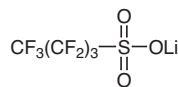
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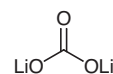
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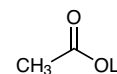
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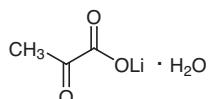
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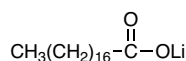
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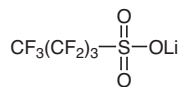
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Lithium Stearate  
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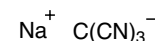
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Sodium Tetrafluoroborate  
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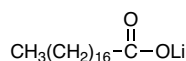
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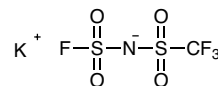
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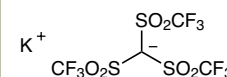
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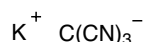
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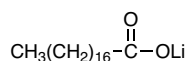
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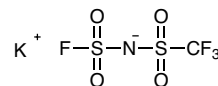
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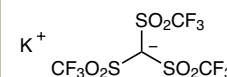
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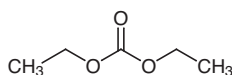
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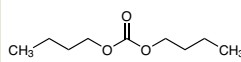
## Organic Solvents

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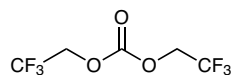
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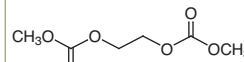
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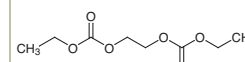
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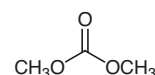
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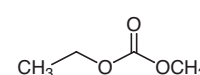
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

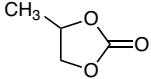
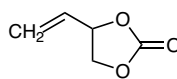
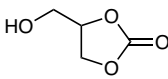
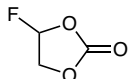
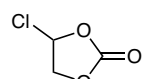
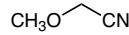
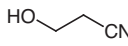
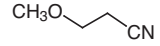
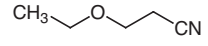
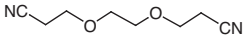
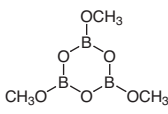
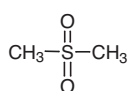
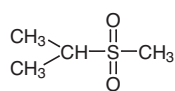
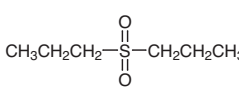
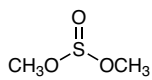

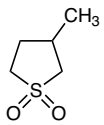



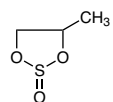

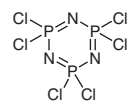
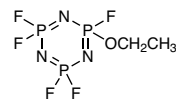
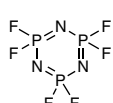
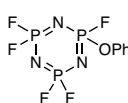
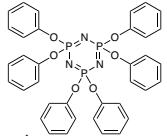
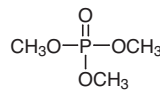


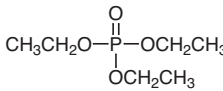
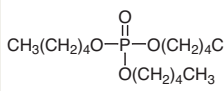
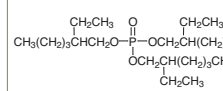
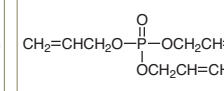
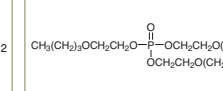
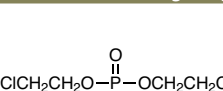
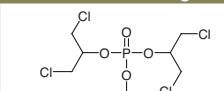
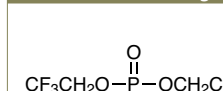
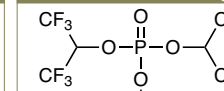
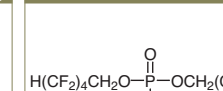
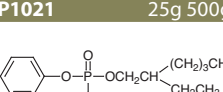
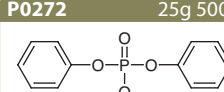
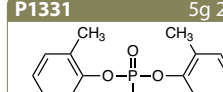
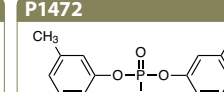
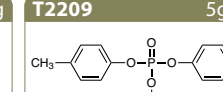
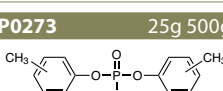

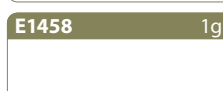
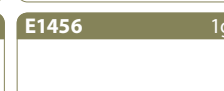
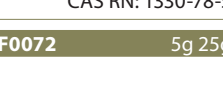
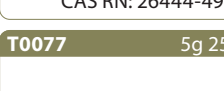


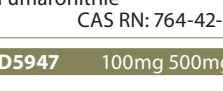
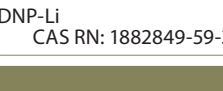





Dimethyl Carbonate  
CAS RN: 616-38-6

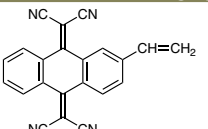
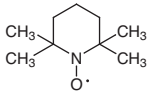
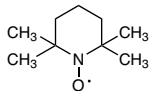
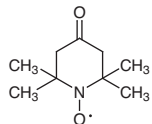
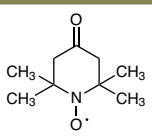
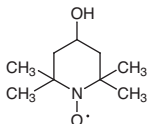
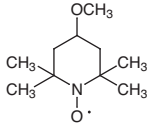
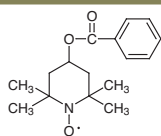
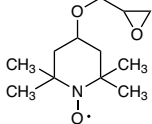
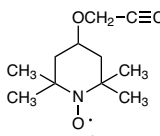
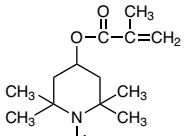
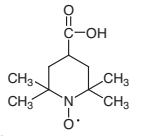
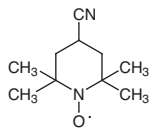
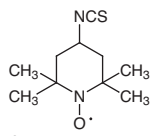
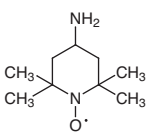
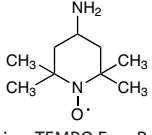
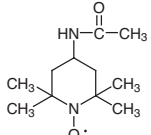
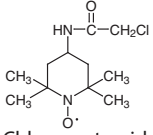
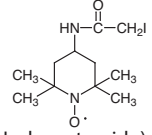
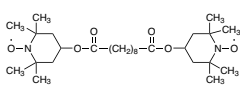
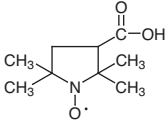
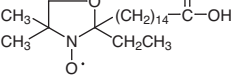
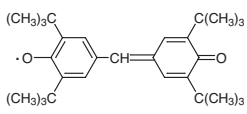
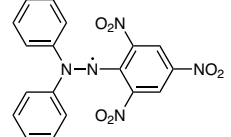
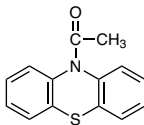
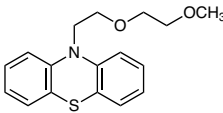
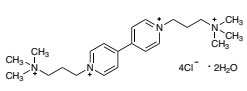
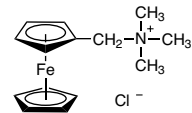
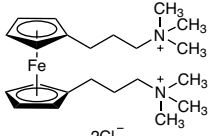
C1342 10mL 25mL



Ethyl Methyl Carbonate  
CAS RN: 623-53-0

<p><b>V0015</b> 5g 25g</p>  <p>Vinylene Carbonate (stabilized with BHT) CAS RN: 872-36-6</p>	<p><b>E0076</b> 25g 500g</p>  <p>Ethylene Carbonate CAS RN: 96-49-1</p>	<p><b>P0525</b> 25g 500g</p>  <p>Propylene Carbonate CAS RN: 108-32-7</p>	<p><b>V0114</b> 25g 100g</p>  <p>Vinylethylene Carbonate CAS RN: 4427-96-7</p>	<p><b>G0279</b> 25g</p>  <p>Glycerol 1,2-Carbonate CAS RN: 931-40-8</p>	
<p><b>F0731</b> 5g 25g</p>  <p>Fluoroethylene Carbonate CAS RN: 114435-02-8</p>	<p><b>C1858</b> 5g 25g</p>  <p>Chloroethylene Carbonate CAS RN: 3967-54-2</p>	<p><b>Nitriles</b></p>		<p><b>M0103</b> 5mL 25mL</p>  <p>Methoxyacetonitrile CAS RN: 1738-36-9</p>	<p><b>C0450</b> 25mL 100mL 500mL</p>  <p>Ethylene Cyanohydrin CAS RN: 109-78-4</p>
<p><b>M0653</b> 25mL 500mL</p>  <p>3-Methoxypropionitrile CAS RN: 110-67-8</p>	<p><b>E0299</b> 25mL 500mL</p>  <p>3-Ethoxypropionitrile CAS RN: 2141-62-0</p>	<p><b>E0108</b> 25g 100g</p>  <p>1,2-Bis(2-cyanoethoxy)-ethane CAS RN: 3386-87-6</p>	<p><b>Boric Acid Esters</b></p>		<p><b>T1581</b> 25g 100g</p>  <p>2,4,6-Trimethoxyboroxin CAS RN: 102-24-9</p>
<p><b>Sulfonyls and Related Compounds</b></p>		<p><b>M1239</b> 5g 25g 500g</p>  <p>Dimethyl Sulfone CAS RN: 67-71-0</p>	<p><b>I0484</b> 5g 25g</p>  <p>Isopropyl Methyl Sulfone CAS RN: 4853-74-1</p>	<p><b>D1171</b> 25g</p>  <p>Dipropyl Sulfone CAS RN: 598-03-8</p>	<p><b>D0264</b> 25g 500g</p>  <p>Dimethyl Sulfite CAS RN: 616-42-2</p>
<p><b>T0115</b> 5g 25g 500g</p>  <p>Sulfolane CAS RN: 126-33-0</p>	<p><b>M0436</b> 25g 250g</p>  <p>3-Methylsulfolane CAS RN: 872-93-5</p>	<p><b>P0324</b> 25g 100g 500g</p>  <p>1,3-Propanesultone CAS RN: 1120-71-4</p>	<p><b>B0136</b> 25g 250g</p>  <p>1,4-Butanesultone CAS RN: 1633-83-6</p>	<p><b>D2977</b> 5g 25g</p>  <p>Ethylene Sulfite CAS RN: 3741-38-6</p>	
<p><b>M2471</b> 5g 25g</p>  <p>1,2-Propylene Sulfite (mixture of isomers) CAS RN: 1469-73-4</p>	<p><b>D2830</b> 5g 25g</p>  <p>Ethylene Sulfate CAS RN: 1072-53-3</p>	<p><b>Battery Additives</b></p>			
<p><b>Phosphazenes</b></p>		<p><b>C0584</b> 25g 250g</p>  <p>Phosphonitrilic Chloride Trimer CAS RN: 940-71-6</p>	<p><b>E1140</b> 1g 5g</p>  <p>Ethoxy(pentafluoro)-cyclotriphosphazene CAS RN: 33027-66-6</p>		
<p><b>H1429</b> 5g 25g</p>  <p>Hexafluoro-cyclotriphosphazene CAS RN: 15599-91-4</p>	<p><b>P2286</b> 1g 5g</p>  <p>Pentafluoro(phenoxy)-cyclotriphosphazene CAS RN: 33027-68-8</p>	<p><b>H1356</b> 5g 25g</p>  <p>Hexaphenoxy-cyclotriphosphazene CAS RN: 1184-10-7</p>	<p><b>Phosphate Esters</b></p>		<p><b>P0271</b> 25g 500g</p>  <p>Trimethyl Phosphate CAS RN: 512-56-1</p>

<b>P0270</b> 25g 500g  Triethyl Phosphate CAS RN: 78-40-0	<b>P0265</b> 5mL 25mL  Triamyl Phosphate CAS RN: 2528-38-3	<b>P1022</b> 25mL 500mL  Trioctyl Phosphate CAS RN: 78-42-2	<b>P0264</b> 25mL 100mL  Triallyl Phosphate CAS RN: 1623-19-4	<b>P0683</b> 25g 500g  Tris(2-butoxyethyl) Phosphate CAS RN: 78-51-3
<b>T3447</b> 25g 100g  Tris(2-chloroethyl) Phosphate CAS RN: 115-96-8	<b>P0269</b> 25g 500g  Tris(1,3-dichloro-2-propyl) Phosphate CAS RN: 13674-87-8	<b>T3203</b> 5g 25g  Tris(2,2,2-trifluoroethyl) Phosphate CAS RN: 358-63-4	<b>T3041</b> 1g 5g  Tris(1,1,1,3,3,3-hexafluoro-2-propyl) Phosphate CAS RN: 66489-68-7	<b>P1134</b> 10g  Tris(1H,1H,5H-octafluoropentyl) Phosphate CAS RN: 355-86-2
<b>P1021</b> 25g 500g  Octyl Diphenyl Phosphate CAS RN: 1241-94-7	<b>P0272</b> 25g 500g  Triphenyl Phosphate CAS RN: 115-86-6	<b>P1331</b> 5g 25g  Tri-o-cresyl Phosphate CAS RN: 78-30-8	<b>P1472</b> 5g  Tri-m-cresyl Phosphate CAS RN: 563-04-2	<b>T2209</b> 5g 25g  Tri-p-cresyl Phosphate CAS RN: 78-32-0
<b>P0273</b> 25g 500g  Tricresyl Phosphate (mixture of isomers) CAS RN: 1330-78-5	<b>P0259</b> 25mL 500mL  Cresyl Diphenyl Phosphate (mixture of analogue) CAS RN: 26444-49-5	<b>E1458</b> 1g 5g  Ethyl Ethylene Phosphate CAS RN: 823-31-4	<b>E1456</b> 1g 5g  TFEP CAS RN: 67605-68-9	<h2 style="text-align: center;">Nitriles</h2>
<b>F0072</b> 5g 25g  Fumaronitrile CAS RN: 764-42-1	<b>T0077</b> 5g 25g  Tetracyanoethylene CAS RN: 670-54-2	<b>T3264</b> 1g 5g  Tetracyanoethylene (purified by sublimation) CAS RN: 670-54-2	<b>P1751</b> 1g 5g  1,2,2,3-Tetracyanopropane CAS RN: 1274904-48-1	<h2 style="text-align: center;">Battery Cathode Active Materials</h2>
<b>D5947</b> 100mg 500mg  DNP-Li CAS RN: 1882849-59-3	<h1 style="text-align: center;">Organic Redox Flow Battery Materials</h1>			
<h2 style="text-align: center;">Quinones and Analogues</h2>				
<b>A0308</b> 5g 25g  Disodium Anthraquinone-2,6-disulfonate CAS RN: 853-68-9	<b>A0505</b> 25g  Dipotassium Anthraquinone-1,8-disulfonate CAS RN: 14938-42-2	<b>D5764</b> 5g  2,6-DBEAQ CAS RN: 2370885-20-2	<b>V0139</b> 1g 5g  2-Vinylanthraquinone CAS RN: 13388-33-5	<b>A0506</b> 25g  Anthraquinone-1,5-disulfonate Sodium Salt CAS RN: 853-35-0
<b>V0136</b> 100mg 500mg  9,10-Bis(1,3-dithiol-2-ylidene)-2-vinylanthracene CAS RN: 736998-56-4				

<p><b>V0137</b> 1g 5g</p>  <p>9,10-Bis(dicyanomethylene)-2-vinylnanthracene CAS RN: 1612793-07-3</p>	<p><b>Organic Radicals</b></p>	<p><b>T1560</b> 5g 25g</p>  <p>TEMPO Free Radical CAS RN: 2564-83-2</p>	<p><b>T3751</b> 1g 5g</p>  <p>TEMPO Free Radical (purified by sublimation) CAS RN: 2564-83-2</p>	<p><b>O0266</b> 5g 25g</p>  <p>4-Oxo-TEMPO Free Radical CAS RN: 2896-70-0</p>
<p><b>O0521</b> 1g</p>  <p>4-Oxo-TEMPO Free Radical (purified by sublimation) CAS RN: 2896-70-0</p>	<p><b>H0865</b> 5g 25g</p>  <p>TEMPOL Free Radical CAS RN: 2226-96-2</p>	<p><b>M1197</b> 1g 5g</p>  <p>4-Methoxy-TEMPO Free Radical CAS RN: 95407-69-5</p>	<p><b>H0878</b> 1g 5g</p>  <p>4-Hydroxy-TEMPO Benzoate Free Radical CAS RN: 3225-26-1</p>	<p><b>G0555</b> 1g 5g</p>  <p>4-Glycidyloxy-TEMPO Free Radical CAS RN: 122413-85-8</p>
<p><b>T3169</b> 1g 5g</p>  <p>4-(2-Propynyloxy)-TEMPO Free Radical CAS RN: 147045-24-7</p>	<p><b>M1531</b> 1g 5g</p>  <p>TEMPO Methacrylate CAS RN: 15051-46-4</p>	<p><b>C1428</b> 100mg 1g</p>  <p>4-Carboxy-TEMPO Free Radical CAS RN: 37149-18-1</p>	<p><b>C1782</b> 1g</p>  <p>4-Cyano-TEMPO Free Radical CAS RN: 38078-71-6</p>	<p><b>I0486</b> 100mg 1g</p>  <p>4-Isothiocyanato-TEMPO Free Radical CAS RN: 36410-81-8</p>
<p><b>A1343</b> 1g 5g</p>  <p>4-Amino-TEMPO Free Radical CAS RN: 14691-88-4</p>	<p><b>A3235</b> 200mg 1g</p>  <p>4-Amino-TEMPO Free Radical (purified by sublimation) CAS RN: 14691-88-4</p>	<p><b>A1348</b> 5g 25g</p>  <p>4-Acetamido-TEMPO Free Radical CAS RN: 14691-89-5</p>	<p><b>C1432</b> 100mg 1g</p>  <p>4-(2-Chloroacetamido)-TEMPO Free Radical CAS RN: 36775-23-2</p>	<p><b>I0487</b> 100mg</p>  <p>4-(2-Iodoacetamido)-TEMPO Free Radical CAS RN: 25713-24-0</p>
<p><b>B5642</b> 1g 5g</p>  <p>Bis(2,2,6,6-tetramethyl-4-piperidyl-1-oxyl) Sebacate CAS RN: 2516-92-9</p>	<p><b>C1406</b> 1g</p>  <p>3-Carboxy-PROXYL Free Radical CAS RN: 2154-68-9</p>	<p><b>D2399</b> 25mg 100mg</p>  <p>16-DOXYL-stearic Acid Free Radical CAS RN: 53034-38-1</p>	<p><b>G0020</b> 1g 5g</p>  <p>Galvinoxyl Free Radical CAS RN: 2370-18-5</p>	<p><b>D4313</b> 250mg 1g 5g</p>  <p>DPPH Free Radical CAS RN: 1898-66-4</p>
<p><b>Other Organic Active Materials</b></p>	<p><b>A3154</b> 1g 5g</p>  <p>10-Acetylphenothiazine CAS RN: 1628-29-1</p>	<p><b>M3068</b> 10g</p>  <p>MEEPT CAS RN: 2098786-35-5</p>	<p><b>B5659</b> 5g</p>  <p>BTMAP-Vi Dihydrate CAS RN: 108228-37-1</p>	<p><b>F1231</b> 1g 5g</p>  <p>FcNCl CAS RN: 83617-79-2</p>
<p><b>B5660</b> 5g</p>  <p>BTMAP-Fc CAS RN: 2093414-16-3</p>				

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