

We, **Vortex Products Ltd.** could offer fine chemical intermediates and other organic chemicals, which are widely applied in different fields, including electroplating intermediates, electroplating materials, electroplating additives, fluoro-containing chemicals and electrolysis fluoro-containing chemicals, pharmaceutical, pesticide, dyestuffs, etc.

## Organic fluoro-containing chemicals

### **FT-248 (Tetraethylammonium perfluorooctanesulfonate)**

Trade name:	FT-248
CAS No.:	56773-42-3
Molecular formula:	CF <sub>3</sub> (CF <sub>2</sub> ) <sub>7</sub> SO <sub>3</sub> -(C <sub>2</sub> H <sub>5</sub> ) <sub>4</sub> N <sup>+</sup>
Molecular formula:	C <sub>16</sub> H <sub>20</sub> F <sub>17</sub> NSO <sub>3</sub>
Molecular weight:	629
pH value:	2-3
Density (20&deg C):	-1.2g/cm <sup>3</sup>
Freezing Point:	-3&deg C
Surface Tension &gamma:	22 dynes/cm (0.1% aqua)
Assay:	98%
Appearance:	White powder
Surface tension:	22mN/m(0.1% aqueous solution)

Application:

1. Used as chrome-fume suppressor for both decorative and functional chromium plating, (level of addition: 25mg~50mg/ liter)
2. Used as wetting agent, leveling agent and antistatic agent for photographic paper and film
3. Used as wetting agent for glass etching and opacification baths
4. Used as wetting agent for acid baths for metal surface treatment e.g. anodizing baths, chromicizing baths.
5. Used as de-mold agent for plastic tetraethylammonium

### **Environmental chromium fog inhibitor**

#### **BT-10 (Perfluorohexyl ethyl sulfonic acid)**

CAS No.:	27619-97-2
Molecular formula:	C <sub>8</sub> H <sub>5</sub> F <sub>13</sub> O <sub>3</sub> S
Molecular weight:	428.17
Content:	30%
Appearance:	Colorless transparent liquid

Addition: The first addition is 0.24g/L, the supplementation is very small, smaller than FC-248.

Usage: environmentally friendly chromium fog inhibitor, developed on the basis of hexafluorocarbon chain technology, will not decompose into perfluorooctanoic acid and its salt (PFOA & PFOS) and bring environmental problems.

This product is a new type of chromium fog inhibitor. It forms a microbubble film on the surface of the plated parts, inhibits the formation of chromic acid fog, and can replace FC-248. It can be used in organic fluorine synthesis, fluorinated surfactants and other important intermediates, pharmaceutical intermediates, electroplating intermediates.

#### **FT-95 (Potassium perfluorooctylsulfonate)**

Trade name:	FT-95
CAS No.:	2795-39-3
Structure formula:	CF <sub>3</sub> (CF <sub>2</sub> ) <sub>7</sub> SO <sub>3</sub> K
Molecular formula:	C <sub>8</sub> F <sub>17</sub> SO <sub>3</sub> K
Molecular weight:	538

Assay:  $\geq 98\%$   
Appearance: White or yellowish crystalline powder  
Decomposed temperature:  $390^{\circ}\text{C}$   
Surface tension:  $22\text{mN/m}$

Application: It is perfluoro anion surfactant which mainly used as chrome fog depressant and wetting agent for electroplating and additive in fluoro protein fire foam fighting

#### **FT-120 (Ammonium perfluorooctylsulfonate)**

CAS No.: 29081-56-9  
Trade name: FT-120  
structure formula:  $\text{CF}_3(\text{CF}_2)_7\text{SO}_3\text{NH}_4$   
Molecular formula:  $\text{C}_8\text{H}_{17}\text{F}_{17}\text{O}_3\text{NS}$   
Molecular weight: 517  
Assay:  $\geq 95\%$

Appearance: Colorless or yellowish powder

Application: It is a kind of perfluoro anion surfactant and can be used as wetting agent, leveling agent and abluent in coating. The reference usage is 0.1-0.01%.

#### **FT-4 (Perfluorobutylsulfonyl fluoride)**

Trade name: FT-4  
CAS No.: 375-72-4  
MF:  $\text{C}_4\text{F}_9\text{SO}_2\text{F}$   
Appearance: clear colorless or slightly yellow liquid  
Boiling point:  $65-66^{\circ}\text{C}$   
Refractive index( $n_{25\text{D}}$ ): 1.2810  
Density ( $d_{420}$ ): 1.750-1.700  
Assay: 99% (GC)  
PH: 3.8-4.8

Application: It is the homologue of perfluorooctylsulfonyl fluoride and can be used to synthesize various of special perfluoro surfactants. Its potassium salt is an excellent anion surfactant and fire retardant for polycarbonate.

#### **FC-97 (Potassium Perfluorohexanesulfonate)**

CAS No.: 3871-99-6  
Molecular Formula:  $\text{C}_6\text{F}_{13}\text{SO}_3\text{K}$   
Molecular weight: 438  
Appearance: white or light-yellow powder  
mp:  $285^{\circ}\text{C}$   
Density ( $20^{\circ}\text{C}$ ):  $1.5\text{ g/cm}^3$   
Surface Tension  $\gamma$ : 22 dynes/cm (0.1% aqua)  
Content:  $\geq 95\%$

Package & Storage & Transportation: 500g $\times$ 10 for plastic bottle and 500g for fresco bag with external solid paper box. Storage is in light of the regulations of general chemicals.

#### **FT-134 (perfluoro alkyl sulfonyl quaternary ammonium iodides)**

CAS No.: 1652-63-7  
Trade name: FT-134  
Chemical name: N,N-dimethyl,3-perfluorooctylsulfonylpropyl-aminium, iodide

structure formula:  $\text{CF}_3(\text{CF}_2)_7\text{SO}_2\text{NHCH}_2\text{CH}_2\text{N}^+(\text{CH}_3)_3\text{I}^-$   
Molecular formula:  $\text{C}_{14}\text{H}_{16}\text{F}_{17}\text{N}_2\text{O}_2\text{S}$   
Molecular weight: 725.9  
Appearance: Yellowish powder  
Assay: 98%  
Water solubility: The aqueous solution at one percent concentration can form gelatin.  
Surface tension: 17mN/m (1‰ aqueous solution)

Application It is a cation surfactant and keeps good ability in lowering the surface tension no matter in acid, alkaline and neutral medium. It is also used as wetting agent, spreading agent, equalizing agent, light water extinguisher, film coating agent, welding auxiliary agent for electronic crest, and also drainage and anti-oil, anti-water, and anti-dirt for fiber, paper and leather making.

#### **FT-98 (Potassium perfluorobutane sulfonate)**

CAS No.: 29420-49-3  
Trade name: FT-98  
Chemical name: Potassium perfluorobutane sulfonate  
Molecular formula:  $\text{C}_4\text{F}_9\text{KO}_3\text{S}$   
Molecular weight: 338.19  
Assay:  $\geq 98\%$   
Appearance: White or yellowish powder  
PH value: 5-7  
Decomposition temp: 300°C

Application: It is a kind of perfluoro anion surfactant and has the general characters of fluoro surfactant. It is widely used as inflaming retardant for synthetic materials, especially for polycarbonate.

#### **FT-10 (N-ethyl-N-perfluorooctylsulfonlaminoethanol)**

CAS No.: 1691-99-2  
Trade name FT-10  
Chemical name: N-ethyl-N-perfluorooctylsulfonlaminoethanol  
structure formula:  $\text{CF}_3(\text{CF}_2)_7\text{SO}_2\text{N}(\text{C}_2\text{H}_5)\text{CH}_2\text{CH}_2\text{OH}$   
Molecular formula:  $\text{C}_{12}\text{H}_{10}\text{F}_{17}\text{O}_3\text{NS}$   
Appearance at room temp: white or yellowish waxy solid and turned into amber liquid after being melted.  
Melting point: 55-65°C  
elated density: @80°C 1.71g/ml  
Assay:  $\geq 95\%$

Application It is a kind of nonionic fluoro-containg and the intermediate preparing various of fluoro-containg surfactants and surface treating agent. In addition the important material synthesizing perfluoro alkyl acrylate.

#### **N-Fluorobenzenesulfonmide (NFSi)**

CAS No.: 133745-75-2  
Molecular Formula:  $\text{C}_{12}\text{H}_{10}\text{FNO}_4\text{S}_2$   
Molecular Weight: 315.340503 [g/mol]  
Melting Point: 110°C  
Appearance: White crystal  
Purity:  $\geq 98\%$   
Packaging: According to customer requirement.

Application: Reagent employed in a palladium-catalyzed enantioselective fluorination of t-butoxycarbonyl lactones and lactams. Also used in the electrophilic difluorination of dihalopyridines with butyl lithium and in the direct conversion of

alcohols to dibzenesulfonamides with triphenylphosphine. Stable, easy-to-handle, crystalline material which readily transfers F<sup>+</sup> to enolates and carbanions.

## **Chemical intermediates for Ni plating**

### **BASF Golpanol HD electroplating intermediates**

HD (2,5- hexyne diol)

CAS: 3031-66-1

Content: 80%

Packing: 115 kg / barrel

Uses: intermediate semi-bright nickel-plating brightener main ingredients

Chemical properties: hexyne diol

Molar mass: 114.1g / mol

Appearance: Clear, yellow liquid

Concentration: 78-82%

Iodine colorimetric: <15

Density: 1.01-1.03g / cm<sup>3</sup>

PH: (ISO 976,10%) 3.5-6.5

Solubility: Can be miscible with water in any proportion

Application: for the preparation of brightener additive plating industry, and as an inhibitor of anodized aluminum. As a bright and semi-bright nickel-plating secondary brightener, its concentration in 0.1-0.3g / l

### **SSO3(Derivatives from 3- chloro-2-hydroxy-rpopylsulfonate, sodium salt)**

Trade name: SSO3

Chemical class Derivatives from 3- chloro-2-hydroxy-rpopylsulfonate, sodium salt

Assay: 55%

Appearance: colorless and transparent liquid

related density: @20°C 1.29-1.35

refractive index: @20°C 1.3975-1.4088

PH: value 3.0-5.0

Application Impurities tolerance agent, improve covering power at low densities

### **BASF Korantin PP**

Molecular formula: C<sub>6</sub>H<sub>10</sub>O<sub>2</sub>

Appearance: yellow to brown clear liquid

Assay: 65-69%

Water: 31~35 %

pH Value: (ISO 976, 10 %, 23°C): 7.0~10.5

Packing: 60kg/drum

Application: Industrial cleaning, metalworking fluids and corrosion inhibitors pickling bath

### **ALS (Allyl sulfanate, sodium salt)**

CAS No.: 2495-39-8

Trade name: ALS

Chemical name: Allyl sulfanate, sodium salt

structure formula: H<sub>2</sub>C=CH-CH<sub>2</sub>SO<sub>3</sub>Na

Molecular formula: C<sub>3</sub>H<sub>5</sub>SO<sub>3</sub>Na

Molecular weight: 144

Assay: 35%  
Appearance: Colorless to yellowish liquid  
related density: 1.20-1.25  
PH value: 7.0-9.0  
refractive index@20°C: 1.385-1.3920  
Application: Assistant brightener; improve throwing power and ductility of metal.

#### **PPSOH (Pyridinium hydroxy propyl sulfobetaine)**

CAS No.: 3918-73-8  
Trade name: PPSOH  
Chemical name: Pyridinium hydroxy propyl sulfobetaine  
Molecular formula: C<sub>8</sub>H<sub>11</sub>O<sub>4</sub>NS  
Assay: 45% 75%  
Appearance: Colorless to transparent liquid Colorless to Transparent liquid White powder  
PH value: 3.0-5.0 3.0-5.0 4.0-7.0  
Water-solubility Quite soluble in water  
Application High leveling agent for nickel plating Special suitable for high and middle densities

#### **PS (Propynesulfonic acid sodium salt)**

CAS No.: 55947-46-1  
Trade name: PS  
Chemical name: Propynesulfonic acid sodium salt  
Molecular formula: C<sub>3</sub>H<sub>3</sub>O<sub>3</sub>NaS  
Assay: 25%  
Appearance: Yellowish transparent liquid  
related density: @20°C 1.21-1.29  
refractive index: @20°C 1.3900-1.3990  
PH value: 0.6-2.6  
Usage: 50-150mg/l  
Wastage: 12g/KAH  
Application Brightener, leveling agent, dispersant, impurities tolerance agent for Low current region

#### **TCA (Chloral hydrate)**

CAS. No.: 302-17-0  
Molecular formula: C<sub>2</sub>H<sub>3</sub>Cl<sub>3</sub>O<sub>2</sub>  
Assay: 99%  
Appearance: clear colorless crystal  
PH value: 4.0-6.0  
Chloride Assay: 0.01%max  
roasted residue: 0.1%max  
Application: Chemical intermediates for nickel plating, pharmaceuticals, and pesticide.

#### **VS (Vinyl sulphonate, sodium salt)**

CAS No.: 3039-83-6  
Molecular formula: C<sub>2</sub>H<sub>3</sub>NaSO<sub>3</sub>  
Assay: 25-26%  
Appearance: Colorless to yellowish transparent liquid  
Solid content: 35%  
chroma (APHA): 200

PH value: 8-12  
NaCl content: 3-4%  
Unfilterable substance: 0.1%(max)  
inhibitor (p-hydroxy methylphenol): 500PPM(max)  
Application: Chrome and Nickel-plating brightener, and Improve the throwing power, improved ductility and brightener of the coating.

#### **BBI (Dibenzenesulfonimide)**

CAs: 2618-96-4  
Assay: 85%  
Molecular formula: C<sub>12</sub>H<sub>11</sub>O<sub>4</sub>NS<sub>2</sub>  
Linear Formula: (C<sub>6</sub>H<sub>5</sub>SO<sub>2</sub>)<sub>2</sub>NH  
Assay: 85%min or 98%min  
Appearance: White powder  
Melting point: 150-155°C

Application: Sulfonylimide compound, it has physical characteristic of sulfonyl imide soluble in alkaline solution. In electroplating, it is used as primary brightener instead of saccharin, It improves leveling, impurities tolerance, deposit brightness and reduction in overall usage of Saccharin.

It can be use as fine chemical intermediate, such as the raw material for synthesis of N-Fluorobenzenesulfonimide.

#### **BMP (Butynediol propoxylate)**

CAS No.: 1606-79-7  
Molecular formula: C<sub>10</sub>H<sub>18</sub>O<sub>4</sub>  
Related density: @20°C: 1.07-1.09  
PH value: 4.0-7.0  
refractive index: @20°C: 1.4640-1.4726  
Appearance: Brown transparent liquid  
Assay: 95%  
Application: Lasting brightener, weak leveling agent

#### **BOZ(1,4-butynediol)**

CAS No.: 110-65-6  
Molecular formula: C<sub>4</sub>H<sub>6</sub>O<sub>2</sub>  
Structural formula: HOH<sub>2</sub>CCCCCH<sub>2</sub>OH  
Melting point: 42-52°C  
Acetaldehyde content: 0.5%  
Usage: 0.1-0.3g/l  
Assay: 98%  
Appearance: White crystalline powder  
Application: Basic brightener

#### **PA (Propargyl alcohol)**

CAS No. 107-19-7  
Structure formula: HC≡CCH<sub>2</sub>OH  
Molecular formula: C<sub>3</sub>H<sub>4</sub>O  
Assay: 99%  
moisture: 0.2%max  
Appearance: Colorless or yellowish liquid  
Application: Leveling agent, brightener

#### **PPS (Pyridinium propyl sulfobetaine)**

CAS No.: 15471-17-7  
Molecular formula: C<sub>8</sub>H<sub>11</sub>O<sub>3</sub>NS  
PH value: 2.5-6.0(50%aqueous solution)  
Usage: 50-150mg/l  
Wastage: 10g/KAH  
Assay: 98%  
Appearance: White crystalline powder

Application: In watts bright nickel plating, it is a start material to make brightener, A high efficiency brightener and leveler. Because of its high purity, PPS cannot carry other harmful impurity or salts to baths. There will not have

problem of ductility in long duration. It is used to combine with saccharin, one or more ethylene derivatives and wetting agents. These processes make the deposits brighter, level with good ductile character. It is also suitable for still bath.

**PAP (Propargylic alcohol alcoxylate)**

CAS No.: 3973-17-9  
Molecular formula: C<sub>6</sub>H<sub>10</sub>O<sub>2</sub>  
PH value: 6.0-7.5  
Refractive index (at 20 C): 1.4430-1.4455  
Assay: 98%  
Appearance: colorless to yellowish transparent liquid  
Application: Leveling agent, brightening agent for nickel plating, corrosion inhibitor for steel and alu function is best, rust remover and cleaning media in acid solution.

**BEO (Butynediol ethoxylate)**

CAS No.: 1606-85-5  
Molecular formula: C<sub>8</sub>H<sub>14</sub>O<sub>4</sub>  
Assay: 98%  
Appearance: Yellowish to brown red transparent liquid  
related density@20C: 1.11-1.16  
refractive index@20°C: 1.4740-1.4840  
Application: Lasting brightener, weak leveling agent

**EHS (Hydroxyethyl sulfonate, sodium salt)**

CAS No.: 1562-00-1  
Molecular formula: C<sub>2</sub>H<sub>5</sub>O<sub>3</sub>Na  
PH value: 2-4  
related density@20°C: 1.31-1.34  
Water solubility: Quite soluble in water  
Assay: 45%  
Appearance: Colorless to yellowish liquid  
Application: Basic brightener that is used to improve ductile quality and uniformly plating ability.

**TC-EHS (2-ethylhexylsulphate, sodium salt)**

CAS.: 126-92-1  
Molecular formula: C<sub>8</sub>H<sub>17</sub>NaSO<sub>4</sub>  
Assay: 40%min  
Appearance: Yellow Liquid  
Application: Low foam wetting agent, suitable for air agitation  
Packing details: 2 5kg/drum, 200kg/drum

**POPDH (Propargyl-oxo-propene-2,3-dihydroxy)**

CAS No.: 13580-38-6  
Molecular formula: C<sub>6</sub>H<sub>10</sub>O<sub>3</sub>  
related density@20°C: 1.06-1.11  
refractive index@20°C: 1.3900-1.4100  
PH value: 1.0-2.0  
Assay: 50%  
Appearance: Yellowish transparent liquid  
Application: Used with derivative of alkyne-alcohol, synergistic brightness to enhance leveling and filling up ability at low densities

### **MA-80 (Hydroxy propyl-2-mercapto-disulfonic acid sodium)**

Chemical name:	Hydroxy propyl-2-mercapto-disulfonic acid sodium
Molecular formula:	C <sub>16</sub> H <sub>29</sub> O <sub>7</sub> NaS
Molecular weight:	388
Appearance:	Yellowish viscous liquid.
Concentration:	79.0-81.0%
PH value:	5.0~7.0(In 10% water solution)
Specific gravity(20°C):	0.92 ~ 0.96
Solubility(20°C):	2% clear aqueous solution

Application: MA-80 is used as a low foam wetting agent in nickel bath to get rid of pittings and holes in the deposition at a concentration of 20-100 mg/L, it's suitable for both mechanical and air agitation.

Packing: 25Kg/drum, stored in cool and dry place.

### **BCES (Hydroxypropyl)butyne diether disulfonate, sodium salt)**

CAS No.:	67874-62-8
Molecular formula:	C <sub>10</sub> H <sub>16</sub> O <sub>10</sub> Na <sub>2</sub> S <sub>2</sub>
related density@20°C:	1.3820-1.3900
refractive index@20°C:	1.3820-1.3900
PH value:	6.0-7.0
Assay:	25%
Appearance:	Clear yellow or red-tea like liquid

Application: Directly used as brightener and weak leveling agent. When using Together with ATP, PS, it can help improving brightness at densities.

### **BEH (Reaction products of butynediol with epichlorohydrin)**

CAS No.:	68876-96-0
PH value:	7-8(in aqueous solution)
Assay:	60%
Appearance:	Yellow viscous liquid

Application: It is insoluble in water and used as intermediate for nickel plating. It's a general lasting brightener.

### **DEP (N,N-diethylaminopropyne)**

CAS No.:	4079-68-9
Structure formula:	HCCCH <sub>2</sub> N(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub>
Molecular formula:	C <sub>7</sub> H <sub>13</sub> N
related density@20°C:	0.75-0.85
refractive index@20°C:	1.4245-1.4467
PH value:	7min
Water solubility:	Insoluble in water
Assay:	98%
Appearance:	colorless to yellowish transparent liquid

Application: Leveling agent, brightener

### **BEO (Butynediol ethoxylate)**

CAS No.:	1606-85-5
Molecular formula:	C <sub>8</sub> H <sub>14</sub> O <sub>4</sub>
related density@20°C:	1.11-1.16
refractive index@20°C:	1.4740-1.4840
Assay:	98%



Appearance: Yellowish to brown red transparent liquid  
Application: Lasting brightener, weak leveling agent

**POPS (Propargyl-3-sulfopropyl ether, sodium salt)**

CAS No.: 30290-53-0  
Molecular formula:  $C_6H_9O_4SNa$   
Assay: 45%  
Appearance: yellowish liquid  
Application: Brightening agent for nickel plating, it has good leveling effect Together with PPS, PPS-OH.

**PABS (Diethylamino-2-propyne, sulfate)**

CAS No.: 125678-52-6  
Molecular formula:  $C_8H_{15}NO_2$   
related density@20°C: 1.02-1.06  
refractive index@20°C: 1.4190-1.4320  
PH value: 4.5-5.8  
Water solubility: Insoluble in water  
Assay: 70%  
Appearance: Yellowish transparent liquid  
Application: Leveling agent, brightener

**PME (Propyne ethoxylate)**

CAS No.: 3973-18-0  
Molecular formula:  $C_5H_8O_2$   
related density 20°C: 1.01-1.04  
refractive index 20°C: 1.4465-1.4500  
PH value: 6.0-7.0  
Assay: 98%  
Appearance: Colorless to yellowish liquid  
Application: Leveling agent, brightening agent

**HBOPS- Na(3-(2-butyne-1-ol)-sulfopropyl ether, sodium salt)**

CAS No.: 90268-78-3  
Molecular formula:  $C_7H_{11}O_5SNa$   
Molecular weight: 230.2  
related density@20°C: 1.11-1.16  
refractive index@20°C: 1.4720-1.4840  
PH value: 10.5-11.5  
Assay: 50%  
Appearance: Brown yellow transparent liquid  
Application: As an acetylenic compound, it is used as leveling agent and secondary brightener in the formulation of electrolytic watts bright nickel baths. It is usually combined with saccharin, PPS, PPSOH.

**PN (Hydroxymethanesulfoic acid, monosodium salt)**

CAS No.: 870-72-4  
Molecular formula:  $CH_3NaO_4S$   
related density@20°C: 1.20-1.25  
refractive index@20°C: 1.3700-1.3830

PH value: 7min  
Assay: 28%  
Appearance: colorless and transparent liquid  
Application: Leveling agent, brightener

#### **ATPN (S-carboxyethylisothiuronium betaine)**

CAS No.: 5398-29-8  
Molecular formula:  $C_4H_8ClN_2O_2S$   
Assay: 98%  
Appearance: white powder  
Application: Impurities tolerance agent, it can improve covering power at low densities.

#### **HD-M (2,5-dimethyl-2,5-hexynediol)**

CAS No. 142-30-3  
Molecular formula:  $C_8H_{14}O_2$   
Assay: 99%(min)  
Appearance: White crystalline powder  
Application: chemical intermediates for semi-brightener

#### **Semi-bright nickel leveling agent "PBP"**

Appearance: White to pale yellow crystalline powder  
Melting point: 159-162°C  
Assay: 98%min  
Recommended dosage: 20-300mg/L  
Date of expiry: 2 years  
Package: 25kg/fiber drum  
Storage: in cool and dry place  
Application: PBP is a double Pyridinium which contains alkynes, so it has high effect of bright and leveling. The effect of leveling is close to PPS, and even has larger range for leveling. PBP doesn't contains S, and little decomposed products in plating, so it very fit for semi-bright nickel.

#### **EMP (Ethoxyl carboxymethyl pyridinium derivatives)**

Appearance: dark red liquid  
Assay: 40%  
Cl: 17%-18%  
Consumption: 16g/ KAH  
Recommended dosage: 20-150mg/L  
Application: it has strong leveling ability in semi-bright nickel plating, and its' leveling range is 20% wider than PPS, at the same time it doesn't not contain S, it could widely use in bright and semi-bright nickel plating.

## **Chemical intermediates for Zn plating**

#### **NAPE 14-90**

Chemical name: Polyethylen/propylenglycol (beta-naphthyl) (3-sulfopropyl) diether, Kaliumsalz  
CAS No.: 120478-49-1  
Assay: 75%  
Appearance: brown viscous liquid  
Anionic surfactant and carrier

NAPE 14-90 is an anionic, low foaming surfactant without a cloud point. As a sulfonate NAPE 14-90 is stable against hydrolysis over a wide pH range. NAPE 14-90 is used in acid zinc baths as solubilizer for the brightener and as a carrier. NAPE 14-90 increases the cloud point of the bath and leads to bright deposits in the medium and low current densities. Usually, F 11-13 is combined with non-ionic surfactants.

Application: The product is used in barrel and rack plating.

### **EA 15-90**

Chemical name: Polyethyleneglycol octyl (3-sulfopropyl) diether, Kaliumsalz

CAS No: 154906-10-2

Assay: 70%

Appearance: brown viscous liquid

Anionic surfactant and carrier

EA 15-90 is a low foaming anionic surfactant without a cloud point. As a sulfonate EA 15-90 is stable against hydrolysis over a wide pH range. EA 15-90 is used in acid zinc baths as solubilizer for the brightener and as a carrier. EA 15-90 increases the cloud point of the bath and leads to bright deposits in high and medium current densities. Usually, EA 15-90 is combined with non-ionic surfactants.

### **EN 16-80**

CHEMICAL NAME: Octaethyleneglycol octyl ether

CAS No.: 26468-86-0

SYNONYMS: Octanoethoxlat

Assay: 80%

Appearance: brown viscous liquid

Non-ionic surfactant and carrier

EN 16-80 is a low foaming non-ionic surfactant with a high cloud point. The main usage of EN 16-80 are acid zinc baths. In these baths it helps to solve the brightener and improves the deposition in the high current densities.

### **PUB (Polyquaternium-2)**

Chemical name: Diaminoarea polymer

CAS No.: 68555-36-2

Other Name: Polyquaternium-2

Molecular Formula: C<sub>15</sub>H<sub>34</sub>O<sub>4</sub>N<sub>4</sub>

Appearance: colorless to yellowish clear liquid

Assay: 62%

PH: 7.0-8.5(10% solution)

Main Application: It is a cationic surfactant of polyureylene ammonium salt, which can be used as leveling agent in alkaline zinc plating and providing a uniform distribution thickness over a wide range of current densities. In addition, it is used in cosmetics, hair, skin conditioner, cleaning composition and etc.

### **BAR(TC-BAR) Benzylidene acetone**

CAS No.: 1896-62-4

Molecular formula: C<sub>10</sub>H<sub>10</sub>O

refractive index@20°C: 1.5840-1.5873

Melting point: 39.0-41.5°C

Assay: 99%

Appearance: Colorless or yellowish crystalline solid

Application: Brightening agent for zinc plating as grain-fined agent.

### **BPC-48(1-Benzyl pyridinium-3-carboxylate)**

CAS No.: 15990-43-9

Molecular formula:  $C_{13}H_{11}NO_2$

related density@20°C: 1.09

PH value: 5-6

Assay: 34% 48%

Appearance: colorless to yellowish transparent liquid

Application: It has bitter almond smell. As brightening agent in alkaline cyanide and cyanide-free electroplating zinc or cadmium baths, it is Preferably used in combination with IME and MOME.

### **Polyethyleneimine BASF G-35**

CAS No.: 25987-06-8

Molecular formula:  $-(-CH=CH-NH-)_n-$

Formula weight: 2000

PH value: 11-12

Usage: 0.1-10mg/l

Assay: 50%

Appearance: Colorless or yellowish liquid

Application: It is used as basic brightener, crystal-grained agent to improve Dispersion force in alkaline plating for zinc, copper, tin, copper-tin alloy, aluminum alloy and etc.

### **Polyethyleneimine**

CAS No.: 25987-06-8

Molecular formula:  $-(-CH=CH-NH-)_n-$

Formula weight: 300/600/1200/1800/10000/70000

PH value: 11-12

Usage: 0.05-5mg/l

Assay: 99%

Appearance: Colorless or yellowish liquid

Application: It is used as basic brightener, crystal-grained agent to improve Dispersion force in alkaline plating for zinc, copper, tin, copper-tin alloy, aluminum alloy and etc. It is widely used in paper, adhesive, painting, water treatment, cosmetic, gas purification, electroplating, oil, antibacterial and anticorrosion, foodstuff package and biopharmaceutical field.

### **IME (The compound of imidazole and epichlorohydrin)**

CAS No.: 68794-57-9

PH value: 5.0-7.0

related density@20°C: 1.1-1.2

Water-solubility: It is quite soluble in water and methyl alcohol.

Assay: 35%

Appearance: Yellow transparent liquid

Application: It is a polymer of reaction product from the imidazole and epichlorohydrin. In electroplating, it is used as primary brightener combing with BPC-48/34 for cyanide or alkaline cyanide-free zinc plating.

### **IMZ (Imidazole)**

CAS No.: 288-32-4

Molecular formula:  $C_3H_4N_2$

Assay: 99.5%  
Moisture: 0.20%(max)  
Melting point: 88-91°C  
Boiling point: 257°C  
Flash point: 145°C  
Roasted residue: 0.08%(max)  
Related densities: 1.0303

Appearance: white crystal powder, easily soluble in water and alcohol, slightly soluble in benzene, difficult in benzinum, toxic, can cause irritation and corrosion to the skin and mucosa.

Packing details: 25kg/drum

### **OCBA (o-chlorobenzaldehyde)**

CAS No.: 89-98-5  
Molecular formula: C<sub>7</sub>H<sub>5</sub>ClO  
Related density: 1.248  
Free acid: 1.0%(max)  
roasted residue: 0.02%(max)  
Insoluble substance in acid: 0.1%(max)  
Melting point: 10-11.5°C  
Boiling point: 213-213°C  
Flash point: 87°C  
Assay: 99%

Appearance: Colorless or yellowish transparent liquid with the smell of benzaldehyde.

Application: brightening agent for zinc plating

### **MOME (Aqueous cationic polymer)**

CAS No.: 10882-76-0  
PH value: 6.0-8.0  
related density@20°C: 1.1-1.2  
Water-solubility: Quite soluble in water  
Assay: 40%

Appearance: Brown red liquid

Application: Primarily used as brightener and carrier for alkaline cyanide and cyanide-free zinc plating. Usually combining with BPC 48/34.

### **DPE-3-Alkaline zinc intermediate**

Trade name: DPE-3  
Appearance: Colorless transparent liquid  
Assay: 22%

Application: alkaline zinc plating. Usually combining with IME and MOME.

### **Brightener for Zinc plating (Potassium chloride series):**

Purity: 30%      Appearance: Liquid      Package: 25kg/drum

Application: additive for acid zinc plating

Formula & operating conditions	Rack Plating	Barrel-plating
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	Range	Standard	Range	Standard
Potassium chloride (g/L)	180-240	220	180-240	220
Zinc chloride (g/L)	60-80	70	40-60	50
Boric acid (g/L)	25-30	30	30	30
Potassium chloride series brightener (ml/L)	0.3-1.5	1.2	0.3-1.5	0.8
Potassium chloride series softening agent (ml/L)	10-30	25	15-30	25
Ph	4.8-5.8	5.3	4.8-5.8	5.3
Current density (A/dm <sup>2</sup> )	1-6		0.1-3	
Operation temperature (°C)	10-60	30	10-60	30

Notes:

1. Brightener and softening agent must be used together.
2. Mixture ratio for brightener and softening agent:

Brightener: Softening agent: 3:1 or 2:1 mixed at first, then to dilute the mixture using water 5 times of quantities.

## **Chemical intermediates for Cu plating**

### **DPS (N,N-dimethyl-dithiocarbamylpropyl sulfonic acid, sodium salt)**

CAS No.: 18880-36-9

Molecular formula: C<sub>6</sub>H<sub>12</sub>NaO<sub>3</sub>S<sub>3</sub>

Assay: 98%

Appearance: White to yellowish powder

Application: It is used as a brightening agent in acid copper baths and can get a Bright and ductile deposit when used together with polyether and wetting agents.

### **EDTP (N,N,N'-tetra(2-hydropropyl)ethylene diamine)**

CAS No.: 102-60-3

Molecular formula: C<sub>14</sub>H<sub>32</sub>N<sub>2</sub>O<sub>4</sub>

related density@20°C: 1.04-1.06

refractive index@20°C: 1.4470-1.4570

PH value: 7.5-8.5

Assay: 98%

Appearance: Colorless and transparent liquid

Application: It is soluble in water easily, and the aqueous solution shows alkaline, Which is primarily used as complexing agent for chemical Cu plating.

### **SPS (Bis-(sodium sulfopropyl) disulfide)**

CAS No.: 27206-35-5

Molecular formula: C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>S<sub>4</sub>(Na)<sub>2</sub>

Assay: 90%, 97%

Appearance: White or yellowish powder

Application: As a brightening agent for acid copper baths for decorative and functional deposits, it is functionally compatible with most components of typical copper bath formulation such as non-ionic surfactants, polymeric amines

and other mercap to compounds.

### **ZPS (3-(benzothiazolyl-2-mercapto)-propylsulfonate ,sodium salt)**

CAS No.: 49625-94-7  
Molecular formula:  $C_{10}H_{10}O_3NaNS_3$   
Assay: 90%  
Appearance: Yellowish powder

Application: It is used as a brightener in acid copper plating and has an effect of depositing a bright and ductile coating together with polyether's and wetting agents, for the chemical deposition of precious metals. In addition, it is used as a stabilizer to prevent wild deposition.

### **M(2-mercaptobenzimidazole)**

CAS No.: 583-39-1  
Chemical name 2-mercapto-benzimidazole  
Molecular formula  $C_7H_6SN_2$   
Assay 95%  
Appearance White crystal  
melting point 303-304°C  
usage 0.6-1.0mg/l

Application It is soluble in alkaline solution and used as brightener for copper plating, which can brighten and level the deposit. in addition, It can improve working current density. It is often combined with N,SPS.

### **N (Ethenethiourea)**

CAS No.: 96-45-7  
Trade name: N  
Chemical name: Ethenethiourea  
Molecular formula:  $C_3H_6SN_2$   
Assay: 95%  
Appearance: White crystal  
melting point: 1 98-198°C  
usage: 0.4-1.0mg/l

Application: It is soluble in hot alcohol solution. It is used as brightening agent for copper plating and combined with acidic copper plating brightener M, SP and so on.

### **H1 (2-mercapto thiazoline)**

CAS No.: 96-53-7  
Trade name: H1  
Chemical name: 2-mercapto thiazoline  
Molecular formula:  $C_3H_5NS_2$   
Assay: 98%  
Appearance: White needle crystal  
melting point: 105-106°C

Application: It is used as main component of additive for acidic copper plating. Good brightness and level result can be obtained.

### **UPS (3-S-thiuronium propyl sulfonate)**

CAS No.: 21668-81-5  
Molecular formula  $C_4H_{10}N_2O_3S_2$   
Molecular weight 198.2  
PH: 1-4(5% solution)

Assay 95%

Appearance: white powder

Application: It is used as a brightener in acid copper plating and has an effect of depositing a bright and ductile coating together with polyethers and wetting agents, for the chemical deposition of precious metals.

### **JPH (Aqueous of cross-linking polyamide)**

Appearance: Red-brown liquid

Assay: 20%

PH value: 5.0-6.0

Application: It is aqueous solution of cross-linking polyamide, primarily used for acidic copper plating bath, specially used as brightener at low current region, bright, ductile, level results can be obtained when combined with wetting agent beta-naphthol polyethylene glycol and sulfur-containing compounds such as SPS, DPS, etc.

## **Other Fine Chemical**

### **1,3PS (1,3-propane sultone)**

CAS No.: 1120-71-4

Molecular formula:  $C_3H_6O_3S$

Water-solubility: Hardly soluble in water

Assay: 99%

Appearance: Colorless or yellowish transparent liquid( $\geq 31^\circ C$ ) Colorless and transparent crystalline. ( $< 31^\circ C$ )

Application: It is an important chemical intermediate that used as the starting material for many electroplating chemical intermediates, sensitizing dye anionic Gemini surfactants. In addition, it is used into secondary lithium ion solution to improve recycling life.

### **1,4-butane sultone**

CAS No.: 1633-83-6

Molecular formula:  $C_4H_8O_3S$

Water-solubility: Hardly soluble in water

Assay: 99%

Appearance: Colorless to yellowish transparent liquid

Application: It is the homologue of 1,3-propane sultone, and both of them are main chemical intermediates, which is used the synthesis of sensitizing dyes, anionic Gemini surfactants, and secondary lithium-ion solution.

### **Propargyl chloride**

CAS No.: 624-65-7

Molecular formula:  $C_3H_3Cl$

Water-solubility: Little soluble in water

Assay: 99%

Appearance: colorless and transparent liquid

Application: As a propargyl precursor, it is used many kinds of synthesis and pharmaceutical and electroplating chemical intermediates. In addition, it is a good corrosion inhibitor and antirust. And could be weed killer.

### **Hypophosphorous Acid**

CAS: 6303-21-5

UN NO.: 3264

Molecular Formula:  $H_3PO_2$

Assay: 50%min., 65% min.



Molecular Formula: H<sub>3</sub>PO<sub>2</sub>  
Molecular Weight: 65.99  
Melting Point: -25°C (Pure H<sub>3</sub>PO<sub>2</sub>)  
Boiling Point: 108°C (Decomposes)  
Specific Gravity: 1.274  
Stability: Stable under ordinary conditions, when heated strongly or put together with oxidizers, it will be decomposed into phosphine, phosphoric acid, and hydrogen.

Solubility in Water: Miscible

Applications:

1. Pharmaceutic aid as antioxidant
2. Retrieval of non-ferrous
3. Ingredient of electroless plating solutions.
4. Water treatment agent
5. Meat preservative.
6. Prevent the discoloration of polymers
7. Production of chemicals

### **Organic salt**

CAS No: 126-83-0,  
Chemical Name: 3-Chloro-2-hydroxypropane-1-sulfonic acid sodium salt  
Assay: 98.5% min  
Trade name: CHPS-Na  
Molecular formula: C<sub>3</sub>H<sub>6</sub>O<sub>4</sub>ClSNa  
Molecular Weight: 196.6  
Linear Formula: NaSO<sub>3</sub>CH<sub>2</sub>CH(OH)CH<sub>2</sub>Cl  
Appearance: White crystalline powder  
Storage: store at room temperature

Application: As there are halogen atoms and Hydroxy with strong activity, and sulfonate group with Hydrophilic In the molecular instruction of 3-Chloro-2-hydroxypropanesulfonic acid, sodium salt, CHPS-Na is an important functional monomer in the field of synthesizing polymer industry and it is also an organic chemical intermediate which is used in the preparation of Surfactant, modified starch and drilling fluid materials. CHPSNa is mainly used for the production of biological buffer POPSO, MOPSO, TAPSO.

### **PVAM (Polyvinylamine)**

Cationic polymer

CAS No.: 183815-54-5  
Appearance: Light yellow Viscous liquid  
PH: 8.5-10.5  
Density: 1.1-1.2g/ml (25°C)

Applications: It is used in paper making, synthetic polymeric dye, cosmetics, deinking and decolorization of waste paper, Corrosion resistance of metal surface processing, petroleum, Pharmacy, biochemical industries.

### **Thiophene**

Cas No: 110-02-1  
MF: C<sub>4</sub>H<sub>4</sub>S  
Formula weight: 84.14  
Purity: 99.9%  
Appearance: colorless to pale yellow liquid

Application: make pharmaceuticals and dyes

Ridadr: UN2414, Class 3, PGII

A colorless liquid with an unpleasant odor. Insoluble in water and slightly denser than water. Flash point 30°F. Vapors heavier than air. Irritates the skin, eyes, and mucous membranes. Used to make pharmaceuticals and dyes.

### **Methanesulfonyl chloride**

CAS No.: 124-63-0  
MF: CH<sub>3</sub>SO<sub>2</sub>Cl  
Formula weight: 114.6  
Water: 200PPM  
Heavy Metal: 10PPM  
Fe: 10PPM  
Assay: 99.5%  
Appearance: Colorless or yellowish transparent oil liquid, Irritant, can cause tears  
Melting point (°C): -32  
Boiling point (°C): 164  
specific gravity (18/4°C): 1.48  
Density (25°C) CP: 1.97  
Flashing point (°C): 110  
Solubility: Insoluble in water, soluble in alcohol, ether.

Applications: This product is in organic synthesis, dyes, pharmaceuticals, pesticides and other widely used. In organic synthesis can be used as a catalyst, chlorinating agents, curing agents and stabilizers in the dye industry in the production of Disperse Red 343 can be used as raw material for the production of the medicine Osage Lazio, etc; can be adjusted as a color photograph of hair color agent, also can be used as fungicides.

Package: 250kg/drum

Note: This product is corrosive acid, can be water, ammonia reacts with alkaline substances. This is irritating, can cause tears. Shall be sealed transport, should be used to enhance ventilation.

### **Methane Sulfonic Acid**

Cas No.: 75-75-2  
MF: CH<sub>4</sub>O<sub>3</sub>S  
M.W.: 96.1  
Assay: 70%  
Appearance: colorless transparent liquid. Slightly soluble in Benzene, Methylbenzene. Insoluble in alkane.  
APHA: ≤ 10  
Cl(ppm): ≤5  
Sulfate(ppm): 50  
Oxide(ppm): 20  
Fe(ppm): 5  
Pb(ppm): 1  
Zn(ppm): 1  
Cu(ppm): 1  
Ni(ppm): 1  
Flash Point: 189°C,  
Boiling Point: 167~167.5°C/10mmHg  
Freezing Point: 20°C,  
Density: 1.4812

Soluble: Soluble in Water, slightly soluble in Benzene.

Application: use in electroplating and also as organic synthesis intermediates.

Hazards Class:8.1, UN:81626

### **Hypophosphorous acid**

CAS No.: 6303-21-5  
Assay: 50%  
Molecular formula:  $H_3PO_2$   
Phosphorous acid: 0.3% max  
Iron: 0.0005% max  
Sodium: 0.050max  
Chloride: 0.010 max  
Sulfate: 0.010 max  
Calcium: 0.010 max  
Copper: 1 ppm max  
Arsen: 1 ppm max  
Lead: 1 ppm max  
Sb: 1 ppm max  
Color ness ( hazen ): less to 30  
Specific Gravity: 1.210-1.220  
Appearance: Colorless liquid

Application:

- The offer and make phosphate once, for example Calcium Hypophosphite, Magnesium Hypophosphite, Ammonium Hypophosphite, Nickel Hypophosphite, Manganous Hypophosphite, Ferric Hypophosphite, etc.
- It is extensive to use for the medicine, chemical engineering, coating, electroplate, paint, the chemistry electroplates to wait the aspect conduct and actions restores a molecular weight for with synthesizing regulates.

### **1-Vinylimidazole**

CAS No: 1072-63-5  
Molecular formula:  $C_5H_6N$   
Appearance: Colorless to faint yellow transparent liquid  
Water Content:  $\leq 0.5\%$   
Assay:  $\geq 98.0\%$ (GC)

Use: It is mainly used in resin hardener, sensitive chemical reagent and karyoplast of resin inclusion and petroleum industry; it can also be used as high polymer.

Packing: 200kg/plastic drum.

Transportation & storage: It should be stored in cool, dry and ventilative warehouse. Keep it away from fire resource, heat resource, high temperature, moisture, water and insolation. During transportation, please handle it with care to protect its package from breakage and keep it sealed well. It is forbidden to store it together with toxic substance.

Some of the molecules are not listed above, however, you can ask me a question and I will assist you at any time.

Best wishes,

Neil Cox

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