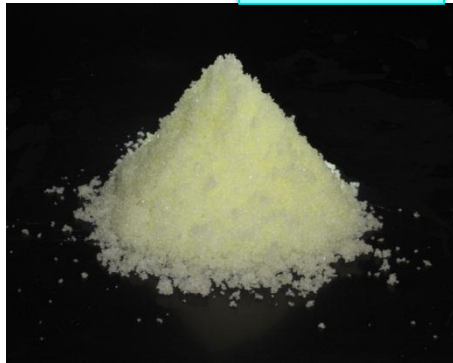


Crystal



Super High Purity
 NaClO aqua

PAC

Poly Aluminum Chloride

ALUM

Aluminum Sulfate Liquid

Agenda

- 1 .Introduction of Nippon Light Metal Holdings
- 2 .Our Chemical Business & Drinking water
- 3 .Expectation for water business in India
- 4 .Method of the water purification
- 5 .Quality of coagulant (PAC & ALUM)
- 6 .SODIUM HYPOCHLORITE (NaClO)

7 December 2015

Nippon Light Metal Co. Ltd.

Chemicals Division Chemicals Department

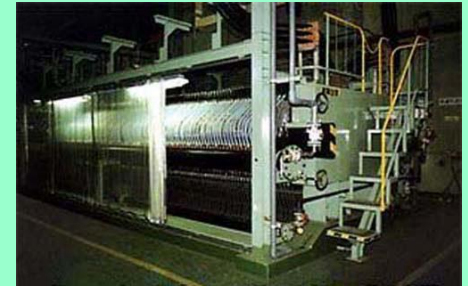
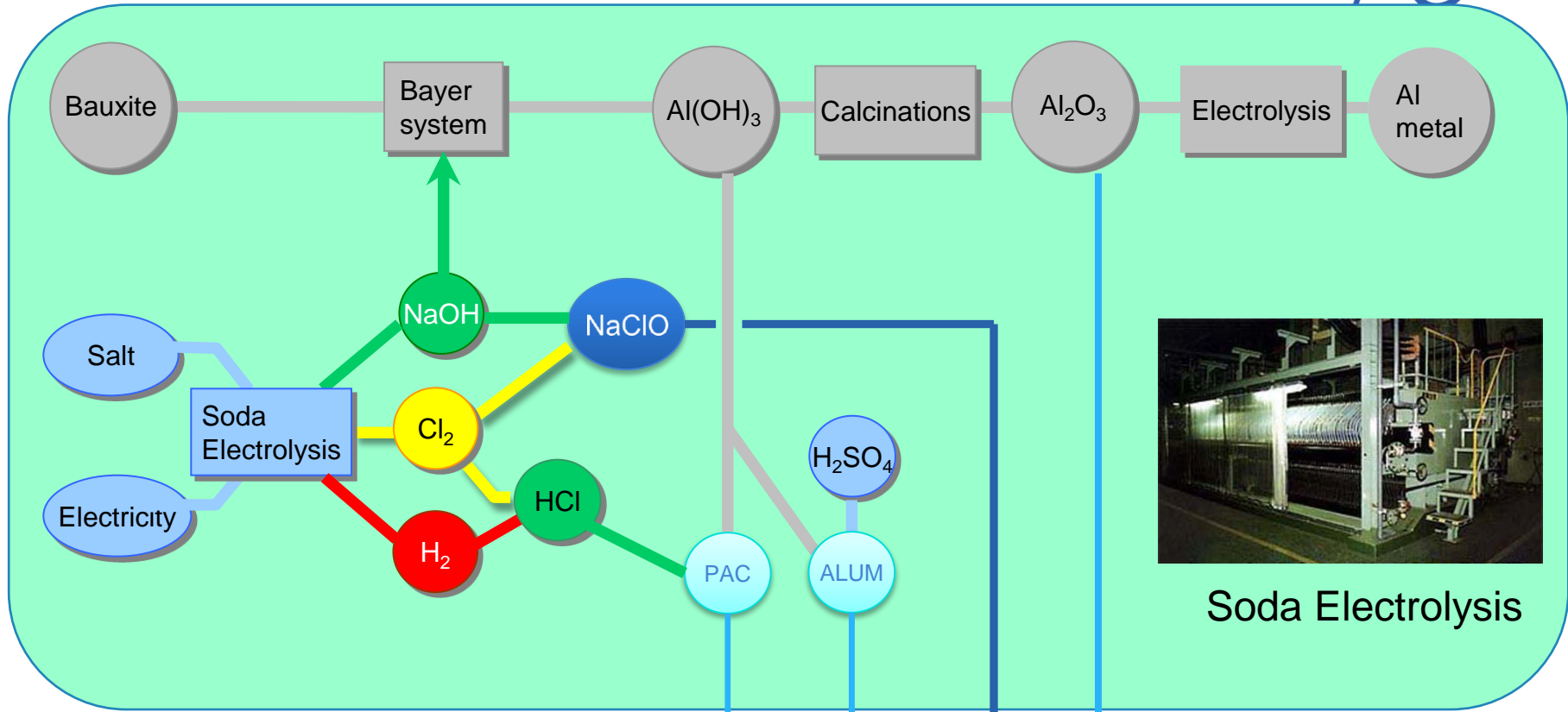
Yoshimori Yuasa

- Established: 1st of October 2012
(subsidiary) **Nippon Light Metal Co., Ltd.**
30th of March 1939
- Capital: JPY39,085 millions
as Rupee 19,540 millions
- Consolidated Sales: JPY431,477
as Rupee 215,740 millions
- Employees: 13,335 persons as a group
(as of 31st of March 2015)

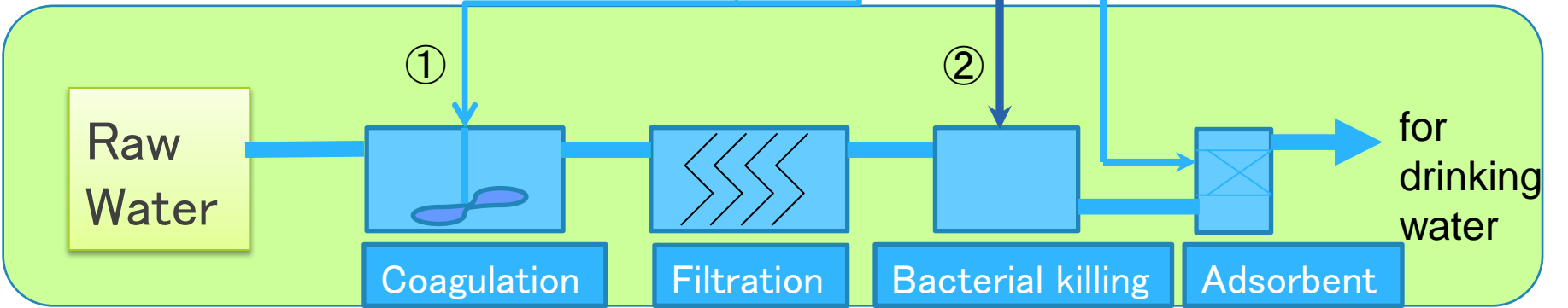


- Business:
 - **Alumina, Aluminum Hydroxide, Soda & Inorganic Chlorides, Fine Chemicals and Coagulants**
 - Aluminum alloy
 - Aluminum sheet and extrusion products
 - Transportation related products, electronic materials, processed products such as aluminum panels for freezers & refrigerators and carbon products
 - Production and sale of aluminum foils and powders

Our Chemical Business & Drinking water



Soda Electrolysis



1. Reason in our wish for business expansion in India
 - We expect the expansion of the market by population growth and economic growth.
2. What I can contribute
 - We wish to contribute with a water treatment chemicals.
High quality
 - ① Coagulant : Poly Aluminum Chloride (PAC),
Aluminum Sulfate Liquid (ALUM)
 - ② Bactericide : Various Sodium Hypochlorite (NaClO)
(Commodity, Low salt grade, Super High Purity, 5H₂O=Crystal)
 - ③ Water supply unit : Portable aluminum container
3. Introduction example
 - Our delivery results : more than 40 years for water purifying plant in Japan
4. Our wish for business forms
 - Export : NaClO 5H₂O
 - Licensing of Technology : PAC, ALUM, NaClO
After conclusion of NDA, Disclosure of our manufacturing method, our plant tour, worker education etc. as needed
5. Expectation to Indian companies : Distributor (Selling and stock management)
6. The business results in India : None

1. Drinking water purification

Coagulation • Precipitation (PAC • ALUM) / Pressure flotation

Cyclone / Sand filtration ※PAC (Poly Aluminum Chloride)、ALUM (Aluminum Sulfate Liquid)

Membrane filtration (MF / UF / Reverse Osmosis membrane)

Bacterial Killing (NaClO / O₃)

Adsorption (Active Carbon / Activated Alumina / Ion Exchange resin)

2. Drainage treatment

Organic substance → Active sludge process / Membrane separation

N、P → Microbial / **Coagulation • Precipitation (PAC • ALUM)**

Heavy Metal → **Coagulation • Precipitation (PAC • ALUM)** / Ion Exchange resin

As → Chelating resin / Coprecipitation process / Activated Alumina

F → Slaked lime / **ALUM** / Activated Alumina

Quality of coagulant (PAC & ALUM)



	Nikkei PAC	Nikkei PAC 60	Aluminum Sulfate Liquid
Appearance	Clear or Light yellow transparent liquid		Clear or Light yellow transparent liquid
Specific Gravity	≥ 1.19 (at20°C)		1.32(at20°C,8% Liquid) 1.27(at20°C,7%Liquid)
pH (1W/V%)	3.5~5.0		
Al ₂ O ₃ Concentration	10.0~11.0%		1) 8.0~8.2% 2) 7.0~7.2%
Basicity	45~65%	55~65%	≥ 3.0
Sulfate(SO ₄ ²⁻)	$\leq 3.5\%$		
Ammoniacal Nitrogen	$\leq 100\text{ppm}$		$\leq 100\text{ppm}$
Arsenic (As)	$\leq 1.0\text{ppm}$		$\leq 2.0\text{ppm}$
Iron (Fe)	$\leq 100\text{ppm}$		$\leq 200\text{ppm}$
Manganese(Mn)	$\leq 15\text{ppm}$		$\leq 15\text{ppm}$
Cadmium (Cd)	$\leq 1.0\text{ppm}$		$\leq 1.0\text{ppm}$
Plumbum (Pb)	$\leq 5\text{ppm}$		$\leq 5\text{ppm}$
Mercury (Hg)	$\leq 0.1\text{ppm}$		$\leq 0.1\text{ppm}$
Chromium (Cr)	$\leq 5\text{ppm}$		$\leq 5\text{ppm}$

SODIUM HYPOCHLORITE : Our Line up



	JWWA NEW SPEC	GRADE Line up			
	TOP-GRADE	5H ₂ O (Crystal)	S GRADE (Super High Purity)	L GRADE (Low Salt)	COMMODITY
Effective Chlorine (%)	≥ 12.0%	41.7%	≥ 12.0%	≥ 12.0%	≥ 12.0%
NaCl (%)	≤ 2%	0.35%	≤ 1.0%	≤ 4.0%	< 14.0%
Free Alkali (%)	≤ 2.0%	0.05%	≤ 1.0%	≤ 2.0%	< 2.0%
Density (g/cc)	≤ 1.16		1.16以下	~1.16	~1.23
Chloric Acid (mg/kg)	≤ 2000	500	≤ 2000	≤ 10000	~6000
Bromic Acid (mg/kg)	≤ 10	6	≤ 10	≤ 100	~100

⇒ We launched Sodium Hypo chlorite S on the market in 2012

Moreover, We launched solid type on the market in 2013 and has no rival !

You can easily produce Super High Purity NaClO aqua with the concentration that you require using NaClO/5H₂O and pure water

Crystal

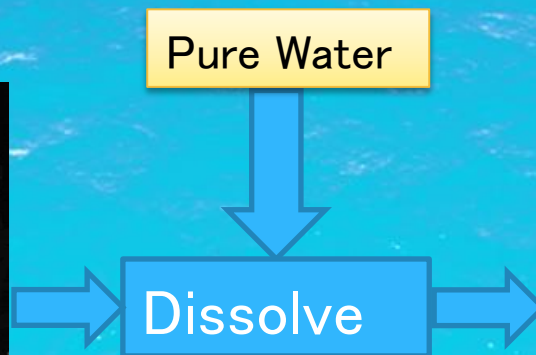


Sodium Hypochlorite 5 hydrate

NaClO · 5H₂O

CAS 10022-70
MITI (1)-237

Pure Water



Super High Purity
Sodium Hypochlorite Solution
NaClO aqua

Confidential

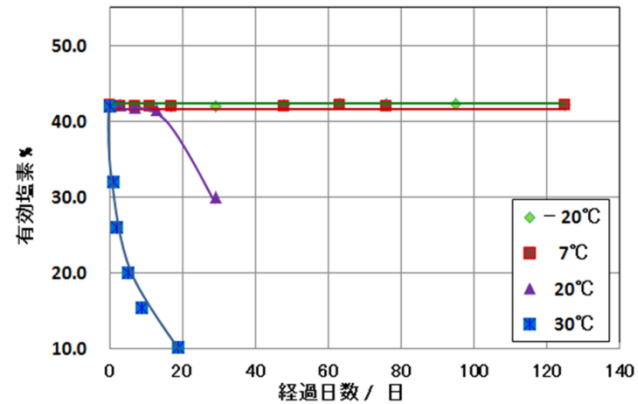
Characteristics of NaClO · 5H₂O



1) Shelf Stability

⇒ Stable over 360 days in cold storage (less than 7°C).

* In Liquid as much as it is high concentration, it is easy to decompose.



2) High Purity

⇒ Hardly contains bromic acids/chloric acids

3) High Concentration

⇒ You can adjust the concentration to 0~42%
Because it is a solid, there are few volumetric capacities in case of transportation and storage.

日本軽金属株式会社

NIPPON LIGHT METAL CO., LTD.



Thank you for your kind attention

Kambara Complex and Kambara Chemical works

