



SPINOMAR® NaSS

Sodium p-Styrenesulfonate



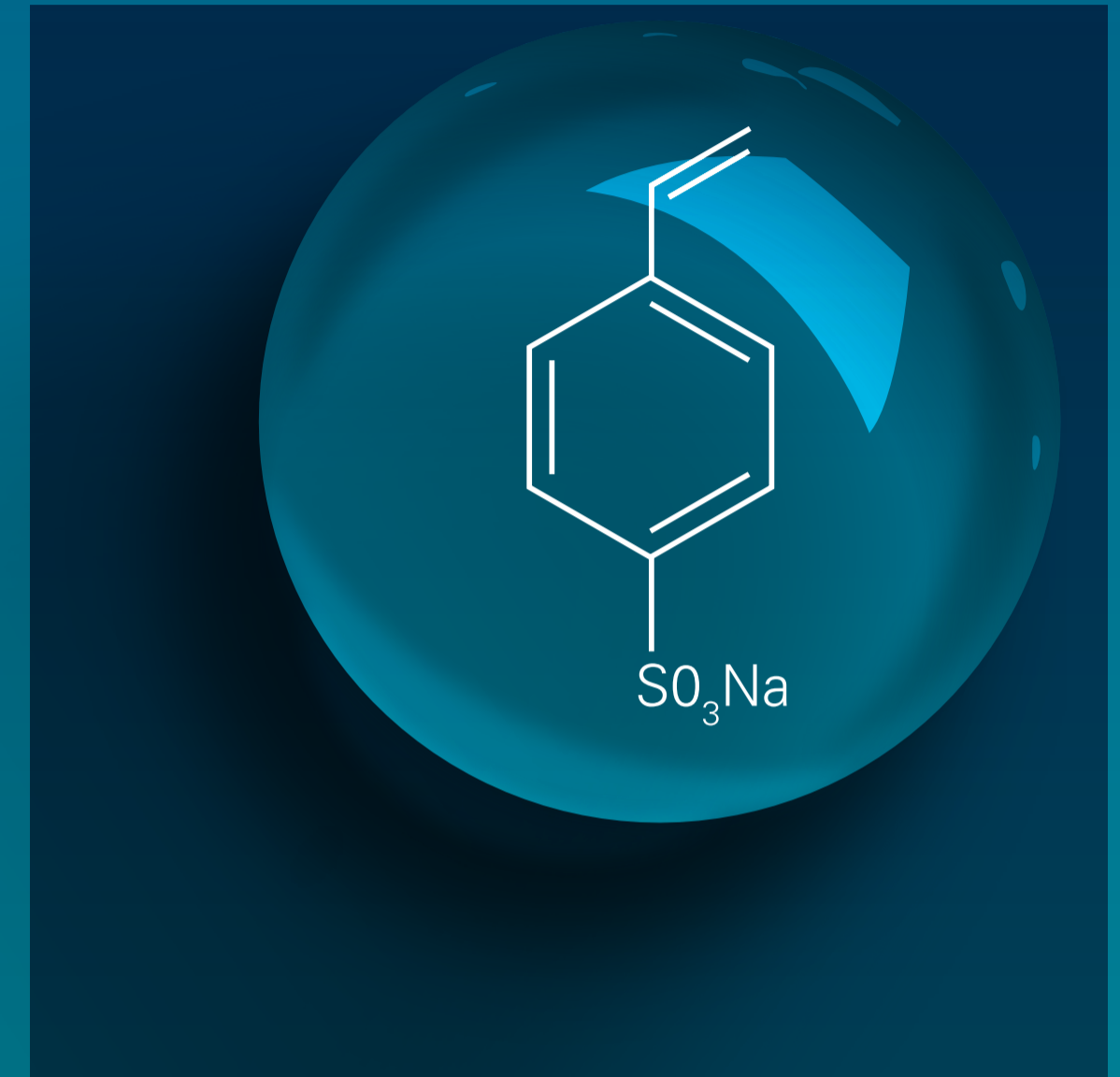
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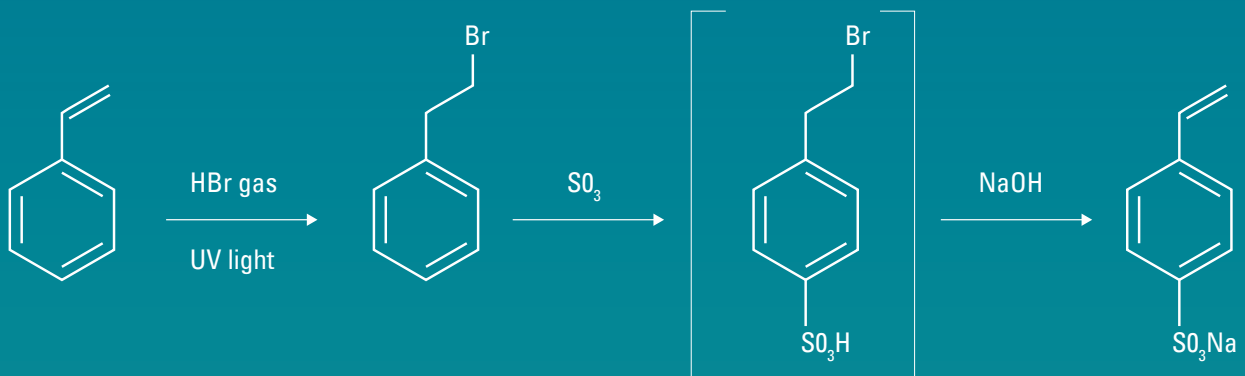


INTRODUCTION



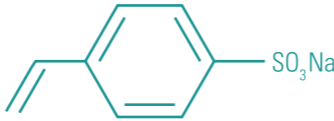
Tosoh's SPINOMAR® NaSS is a unique sulfonated monomer having the highest reactivity among the sulfonated vinyl monomers. Tosoh produces the hemihydrate form of NaSS which provides more storage stability and better handling.

Key properties of NaSS include low toxicity, high reactivity, sulfonate functionality and good surface activity which leads to its use in varied and unique applications.



Taking advantage of Tosoh Corporation's on-site bromine production to produce the anhydrous hydrogen bromide needed for the key intermediate, Tosoh operates the world's only dedicated production facility for NaSS at its factory in Western Japan.

General

Product name	SPINOMAR® NaSS
Generic name	Sodium p-Styrenesulfonate
CAS No.	2695-37-6
Chemical formula	
Appearance	White solid
Molecular weight	206.2
Bulk density	ca. 0.5 g/cm ³
Melting point	> 330°C
Flammability	Non-combustible
Odor	None
Toxicity	Non-toxic

Registrations

REACH	Registered
MITI	(3)-1903
TSCA	Listed
ECL	KE-13273

Product Quality

Item	Specification	Representative value
Purity (%)	84 - 92	88.2
NaBr (%)	≤ 4	2.0
NaOH (%)	≤ 1	0.1
Na ₂ SO ₄ (%)	≤ 1	0.4

CHEMICAL PROPERTIES

With the inductive effect of the sulfo radical in the para position, SPINOMAR® NaSS has the highest reactivity (polymerization activity) of all sulfonated vinyl monomers. Radical polymerizations of SPINOMAR® NaSS can be carried out in polar solvents such as FMD, DMSO and water using common or redox polymerization initiators.

Monomer reactivity

M1	r1	M2	r2	Solvent	Temp. (°C)
SPINOMAR® NaSS	0.55 ± 0.03	Acrylonitrile	0.15 ± 0.02	DMSO	45
	1.20 ± 0.10		0.10 ± 0.02	H ₂ O (pH 3)	45
	1.4 ± 0.4		0.05 ± 0.01	H ₂ O (pH 7)	45
	1.0 ± 0.02	Acrylic acid	0.10 ± 0.02	H ₂ O	70
	2.3 ± 1.2	Sodium acrylate	0.34 ± 0.23	H ₂ O	70
	0.75 ± 0.01	Methacrylic acid	0.62 ± 0.08	H ₂ O (pH 3)	60

USES OF SPINOMAR® NaSS

Applications taking advantage of these properties include acrylic fiber dye improvement, scale inhibition for water treatment, reactive emulsifiers for coatings to reduce conventional surfactant usage, specialty membranes and rheology modifiers for coating and oilfield chemical applications.



Oilfield



Emulsion Paint



Dispersant



Water Treatment



Antistatic Agent

SHIPPING AND STORAGE

SPINOMAR® NaSS is supplied in:

- 25kg net polyethylene-lined paper bag
- 500kg net PVC big bag

SPINOMAR® NaSS must be stored air tight in a dark place like other industrial monomers

SPINOMAR® NaSS is subject to slow-oxidation and / or polymerization when it is dried

SPINOMAR[®] LiSS

General

Product name	SPINOMAR [®] LiSS
Generic name	Lithium p-Styrenesulfonate
CAS No.	4551-88-6

Chemical formula



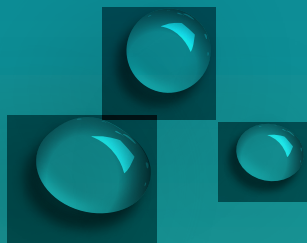
Appearance	White to pale yellow solid
Molecular weight	190.14
Bulk density	ca. 0.5 g/cm ³
Melting point	> 330°C
Flammability	Non-combustible
Odor	None
Toxicity	Non-toxic

Registrations

Einecs	-
MITI	(3)-1948
TSCA	Listed
ECL	KE-32311

Product Quality

Item	Specification
Purity (%)	≥ 81



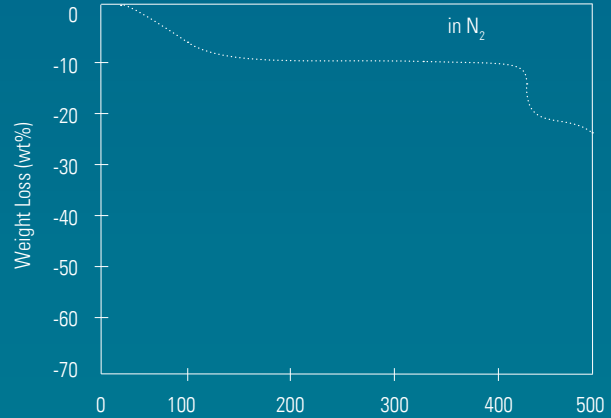


Poly-NaSS

Sodium p-Styrenesulfonate Polymer

Thermal Stability

Poly-NaSS is highly thermally stable. Decomposition of Poly-NaSS does not occur until > 400°C



Temp: r.t → 1000 °C, 10 °C/min
Atmosphere: N₂

Grades

PS-series (20 ~ 22wt% aqueous solution)



M = Na, H

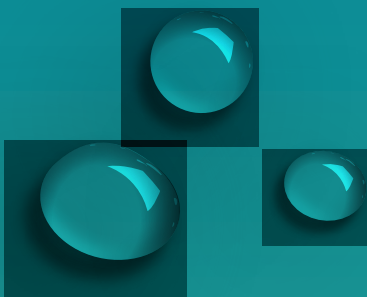
Mw = 5,000 ~ 1,000,000

Specification	PS-1	PS-5	PS-50	PS-100
Appearance	red clear liquid	light yellow clear liquid	light yellow clear liquid	light yellow clear liquid
Active Solid (%)	20 - 22	20 - 22	20 - 22	20 - 22
Viscosity (mPa·s, 25°C)	5 - 10	20 - 50	200 - 500	800 - 1600
pH (25°C)	7 - 9	7 - 9	7 - 9	8 - 11
Molecular Weight (x 10 ⁴)	1 - 3	5 - 10	30 - 40	50 - 70

Packaging

20 kg can

200 kg can



Besides our commercially available monomers SPINOMAR® NaSS and LiSS we have a variety of development SPINOMAR monomers.

The full range



NaSS



LiSS



AmSS



ETSS

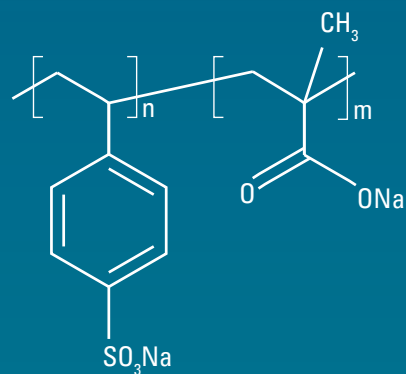
	NaSS	LiSS	AmSS	ETSS
Status	commercial	commercial	development	development
Appearance	white powder	white powder	white powder	yellow liquid

Solubility Product Solubility (wt% at 25°C)

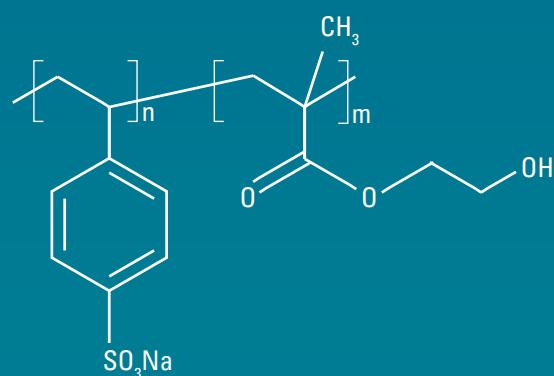
Solvent	NaSS	LiSS	AmSS	ETSS
H ₂ O	19.6	41.5	24.5	insoluble
DMF	8.7	32.3	27.0	miscible
DMSO	19.7	31.2	30.0	miscible
Ethanol	0.3	16.5	3.6	miscible
Toluene	insoluble	insoluble	insoluble	miscible
NMP	6.5	22.5	19.7	miscible



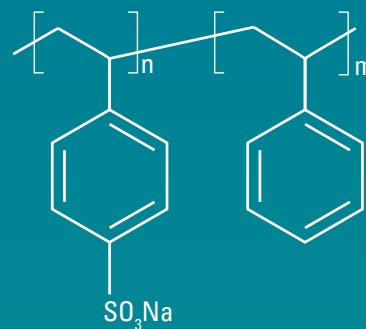
MA-series (20wt% aqueous solution)



HM-series (20wt% aqueous solution)



ST-series (20wt% aqueous solution)



Product Quality

Specification	MA	HM	ST
Appearance	pale yellow clear liquid		
Active Solid (%)	20 - 22	20 - 22	20 - 22
Viscosity (mPa·s, 25°C)	< 10	20 - 50	5 - 10
pH (25°C)	7 - 11	6 - 10	7 - 11
Molecular Weight (x 10 ⁴)	< 1	5 - 10	1 - 3

