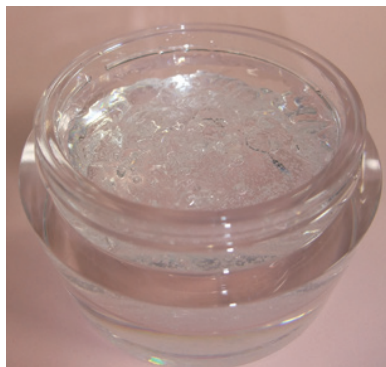


## – Hydrogelator – **ADEKA NOL GT-930**



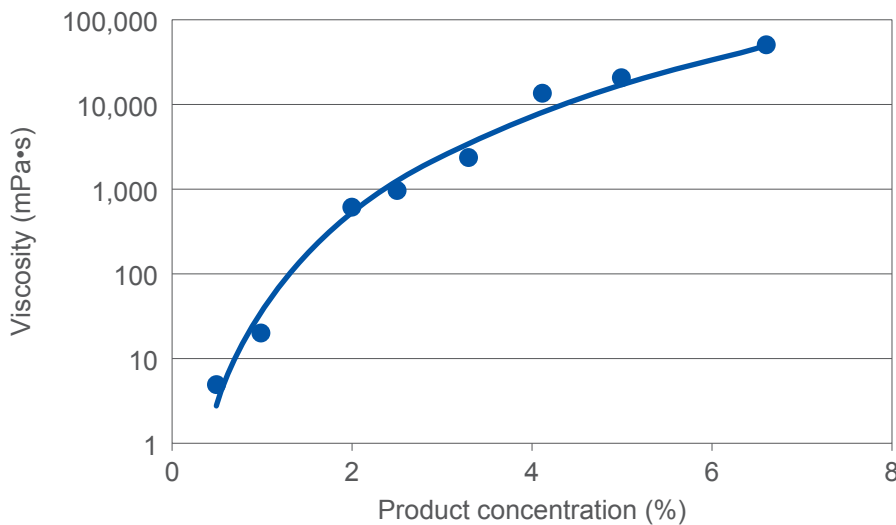
- A gel with viscoelastic behavior can be prepared, equivalent to carbomer but with a superior powder dispersibility.
- Nonionic polymer has no pH dependence and a high salt tolerance.
- Surfactant-free stable O/W emulsions can be prepared.

### **Product Composition**

Cosmetic label name	INCI name	Composition amount (wt%)
Polyurethane-59	POLYURETHANE-59	30
BG	BUTYLENE GLYCOL	55
Water	WATER	14.95
Tocopherol <sup>(*1)</sup>	TOCOPHEROL	0.05

(\*1) Carry-over ingredients

## (1) Relationship between the added amount and viscosity



An elastic gel is obtained by adding 3.3% of GT-930 (1.0% of active ingredients) in water.

## (2) Emulsion stability, powder dispersibility

### [1] Powder dispersion

The dispersion of even high-density titanium oxide in gel is possible.

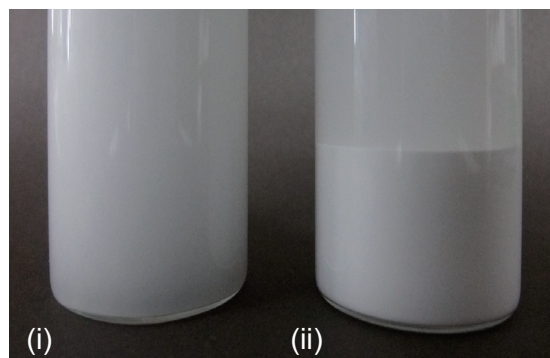
	(i)	(ii)	
ADEKA NOL GT-930	2.7 (pure content 0.8)	–	(wt%)
ADEKA NOL GT-700	–	0.8	
Water	92.3	94.2	
Titanium oxide	5.0	5.0	

### Preparation method

- A gel containing 0.8% of active ingredients was prepared.
- The gel was warmed to 50°C and stirred at 5,000 rpm with a disperser.
- Titanium oxide was added and stirred for 30 minutes.
- The gel was cooled to around room temperature while being stirred.

### Results (storage stability at 25°C)

ADEKA NOL GT-930 demonstrated stable retention of titanium oxide for 3 months or longer.



(i) Stable for 3 months or longer

(ii) Titanium oxide precipitated in a week.

**[2] Surfactant-free emulsions**

O/W emulsions can be prepared even with the use of an oil phase in which hydrophobic powder (titanium oxide, mica, etc.) is mixed.

		I	II	
A	ADEKA NOL GT-930	1.0 (pure content 0.3)	-	
	ADEKA NOL GT-700	-	0.3	
	BG	1.0	1.5	
	Water	28.0	28.2	
B	Liquid paraffin	35.0	35.0	
	Hydrophobic powder	35.0	35.0	(wt%)

**Results (storage stability)**

		I	II
1 Week	40°C	○(Stable)	×(Creaming)
	25°C	○	×

		I	II
1 Month	40°C	×	×
	25°C	○	×

**Appearance  
(stored for a month at 25°C)**

I. ADEKA NOL GT-930



II. ADEKA NOL GT-700

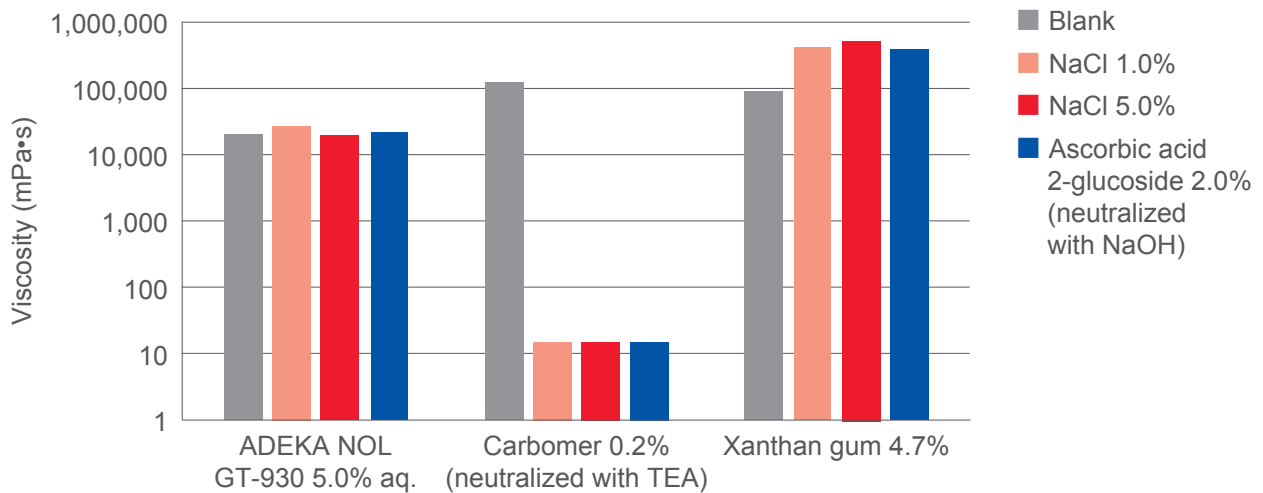
**Preparation method****– Water gel (A) –**

- A gel was prepared as indicated in [1].

**– Emulsion (A+B) –**

- A was warmed to 50°C and stirred at 5,000 rpm with a disperser.
- Pre-mixed slurry B was poured gradually. After the entire amount of B was poured, the mixture was stirred for 10 minutes.
- It was then cooled to room temperature while being stirred.

### (3) Influence of salts






GT-930, which is a nonionic polymer, can be used with both inorganic and organic salts without reducing its viscosity.

### Dissolution Methods

A uniform gel is obtained by adding ADEKA NOL GT-930 to warm water at 50 to 80°C, stirring it in a paddle or disperser mixer and cooling it to room temperature. It can be blended into water at room temperature but requires a longer stirring time and a higher shear force. (Compared to the existing ADEKA NOL GT-730, GT-930 requires a higher shear mixing at a higher temperature to dissolve in water.)

### Stirring conditions and time required for dissolution under lab-scale conditions

Stirring device		Temperature (°C)	Stirring speed (rpm)	Duration
	Paddle mixer	25	250	6h (Partially undissolved)
		50		3h
		80		1h
	Homo mixer	25	4000 - 6000	1h
		50	3000 - 5000	20 min
		80	2000 - 4000	10 min
	Disperser mixer	25	4000 - 6000	1h
		50	3000 - 5000	20 min
		80	2000 - 4000	10 min



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