

# ***Binder for Anode of Lithium Ion Battery***

~ AL series ~

High Performance Latex for Anode of LIB

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“AL series”, binder for anode of lithium ion battery, is high performance latex.

“AL series” has a lot of advantages compared with polyvinylidene fluoride (PVDF).

## Environmentally Friendly Binder

“AL series” is a water-based dispersion. Organic solvents are not needed for coating compound.

Any elimination equipments of organic solvent are not needed because 'AL series' is a water-based dispersion.

## Excellent Adhesion

“AL series” is a dispersion of high performance and fine rubber particle.

Low quantity can be used because 'AL series' have excellent binding power as a binder.

“AL series” shows an excellent adhesion among active material particle and between active material and collector.

## Flexible Electrode

“AL series” presents high flexible electrode because it is rubber latex.

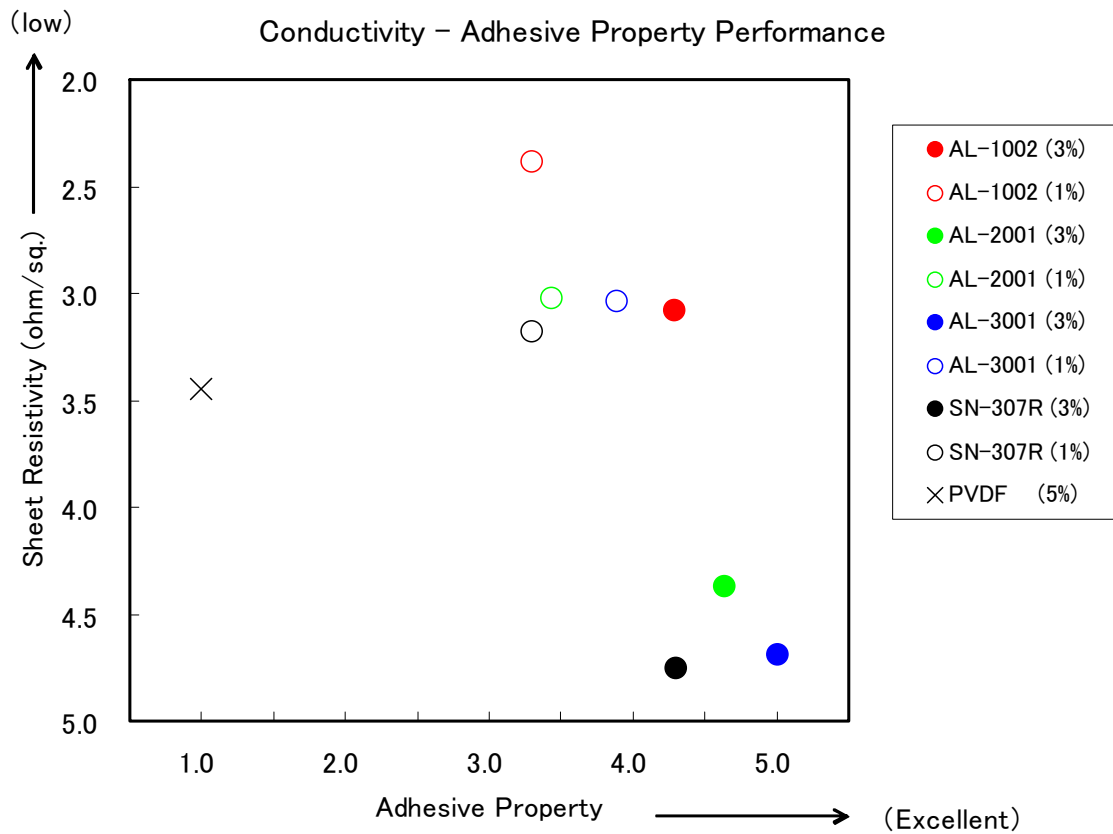
Excellent flexibility is effective on downsizing of the cell.

*NIPPON A&L has developed “AL series”, binder for anode of lithium ion battery,  
from our experience in many kinds of appreciation.*

## AL Series Products

|               |    | AL-1002 | AL-2001 | AL-3001 | SN-307R |
|---------------|----|---------|---------|---------|---------|
| Total solid   | %  | 48.0    | 48.0    | 48.0    | 48.0    |
| pH            |    | 6.0     | 5.0     | 7.0     | 5.0     |
| Particle size | nm | 150     | 220     | 170     | 220     |
| Tg            | °C | 40      | 7       | -15     | 7       |

\*Above value is just a standard value, not a guaranteed value.



## Measurement of Surface Resistivity and Adhesion Property

### 【Slurry Formulation】

- AL series & SN-307R: Graphite/CMC/AL series=96/1/3, 98/1/1 (weight ratio)
- PVDF: Graphite /PVDF=95/5 (weight ratio)
- Total Solid: 30%

### 【Preparation of Anode Sheet】

- Collector: Copper foil (for adhesion test), Polyester sheet (for surface resistivity test)
- Coating: Wire bar coater
- Drying: AL series & SN-307R=130°C PVDF =70°C
- Pressing: Rolling press (35°C 8MPa)
- Thickness of coating layer (after pressing): approx. 60  $\mu$  m
- Density of coating layer (after pressing): approx. 1.3g/cm<sup>3</sup>

### 【Surface Resistivity Test】

- Resistivity meter: Loresta-GP MCP-T610
- Probe: ESP probe  
(Mitsubishi Chemical Analytech Co., Ltd.)

### 【Adhesion Test】

- 1) All strip specimens of anode sheet are stuck on one paperboard.
- 2) Sticky sheet is pressed on to test piece by roll press and the coating layer is peeled.
- 3) Peeling level is relatively evaluated by watching.  
Poor) 1.0 ——— 5.0 (Excellent