



**Fluon® PTFE
for battery use**



AGC Chemicals, R/D div.

Fluon® PTFE (Polytetrafluoroethylene) possesses numerous excellent performances, such as heat resistance, chemical resistance, non-flammability, good electrical properties, low friction, non-sticking, and good weather resistance.

Fluon® PTFE AD(Aqueous Dispersion) or CD(Coagulated Dispersion) grades produced by emulsion polymerization process has unique fibrillation property, i.e, PTFE molecule fibrillates easily by mechanical force. Utilizing this property, Fluon® PTFE is applied for battery cells.

A. Fluon® PTFE AD for battery use

- Usage :
 - 1) Binder for batteries, such as Li-Mn cell, Zn-Air cell, Ni-MH cell, or Li-ion cell.
 - 2) Binder for carbon powder of capacitor cell
 - 3) Water repellent layer in fuel-cell
- Method to be used : 0.3-5% of Fluon® PTFE AD is mixed with powdery active material by blender, mixer, or kneader. Obtained paste is coated on mesh-like substrates. The fibrillated PTFE image is shown in Photo-2. Nonionic surfactant stabilizer in AD grade is possible to be decomposed by heating process at 250-300°C.

Table-1 Fluon® PTFE AD grades for binder use (Typical Value)

Item	Unit	AD91Í Ò	AD93JÒ
PTFE content	%	60	60
Stabilizer	%/PTFE	H	H
Specific gravity		1.52	1.52
Viscosity	mPa·s	2€	2€
pH		9±F	9±F
Mean particle size	μ m	0.25	0.30
Molecular weight of PTFE		Medium	High

AD91Í Ò and AD93JÒ are }[} -APFO type, and the stabilizer is non-ionic green surfactants which is better for environment.



Photo-1 AD

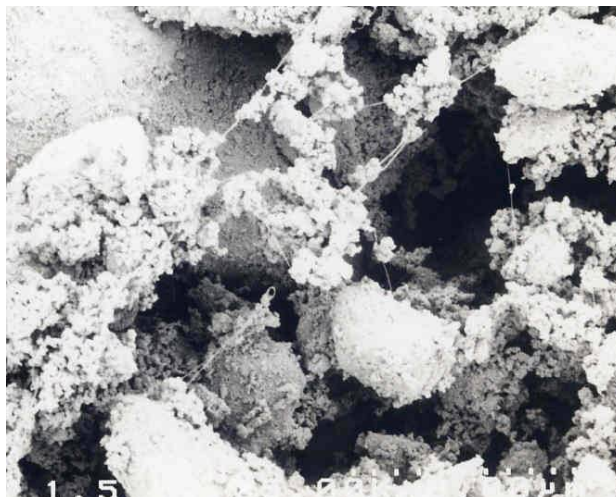


Photo-2 SEM image of fibrillated PTFE(AD) in MnO_2 powder (5%)

B. Fluon® PTFE CD for battery use

- Usage : Separator sheet in coin-type Li-Mn or Zinc-Air cell
- Method to be used : Fluon® PTFE CD is processed stretching into porous sheet. These PTFE sheet has good ion transferability, electrical insulation, chemical stability, and thermal stability. The structure image is shown in Photo-4.

Table-2 Fluon® PTFE CD grades for separator sheet (Typical Value)

Item	Unit	CD100	CD1450	CD1230
Bulk density	g/L	540	500	540
Median particle size	μm	550	550	475
Specific gravity		2.22	2.17	2.16
Tensile strength	MPa	34	37	39
Elongation	%	350	310	300
Molecular weight		Medium	High	High

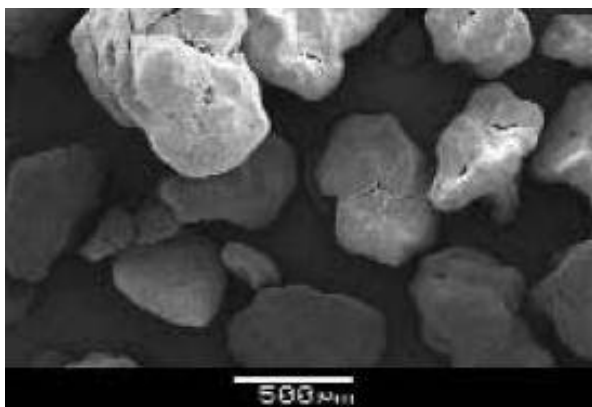


Photo-3 SEM image of CD powder

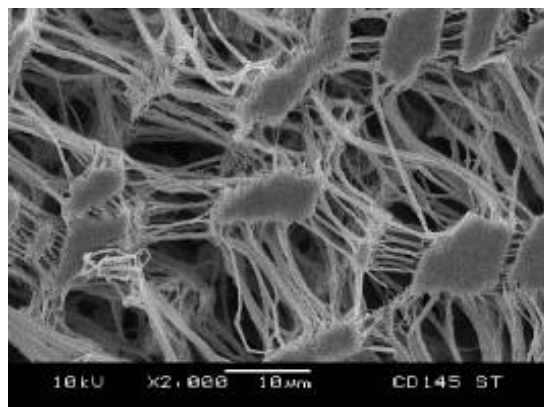


Photo-4 PTFE fibril structure of stretched CD