

MEA prototype technology for fuel cells and electrolysis

For the development of MEA for polymer electrolyte fuel cells (PEFC) and water electrolysis (PEMWE/AEMWE), we propose manufacturing conditions suitable for the materials using KRI's electrode prototyping technology.

Circumstance

- Fuel cells and technological innovation are required to achieve carbon neutrality.
- KRI produces and evaluates membrane electrode assemblies (MEAs), the core components of fuel cells and electrolysis equipment, starting from small quantities, using customer-developed electrode catalysts, ionomers, electrolyte membranes, diffusion layers, and other components.

KRI's MEA prototype technology

For each process, we consider the manufacturing conditions according to the material and produce high-quality MEA prototypes.

MEA prototyping process

① Catalyst ink preparation



Planetary ball mill



Hybrid mixer

- Mixing and dispersing inks suitable for the materials

② Catalyst ink application



Tabletop die coater



Ultrasonic spray

- Large-area coating capabilities: up to \square 300 mm
- Ultrasonic spraying allows direct coating onto electrolyte membranes, such as Nafion, which swell due to moisture absorption.
- Also compatible with catalyst ink application using doctor blades and benchtop die coaters.

③ Catalyst layer press transfer



Hot press

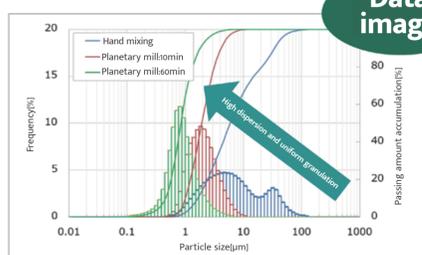
- Press area: up to \square 300 mm
- Pressure: up to 294 kN
- Heating temperature: up to 200°C
- Also suitable for crimping diffusion layers and subgaskets

Physical property evaluation

Catalyst material particle size distribution measurement



Particle size distribution measuring device



◆ Material particle size (different dispersion times)

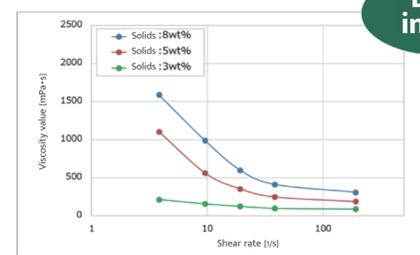
Data image

- Optimize dispersion conditions based on particle size and particle size uniformity of catalyst material

Catalyst ink viscosity measurement



E type viscometer



◆ Ink viscosity (difference in solid content)

Data image

- Consider ink viscosity suitable for the coating method

Suggestion

We handle everything from MEA prototyping to physical property evaluation

- In addition to the standard fabrication method (hot press transfer), we also offer direct application of catalyst ink to the electrolyte membrane and diffusion layer.
- Multiple methods are available for mixing, dispersing, and applying catalyst ink. Please feel free to contact us.