# Reduction technique in amount of platinum used for diesel oxidation catalyst

## Preparation technique of precious metal nano-particle catalyst suitable for mass production

For the practical use of PGM (platinum group metal) nano-particle catalysts with high thermal durability, the surface polyol reduction method suitable for mass production was newly developed. In this method, PGM nano-particles are directly deposited on the support surface through reduction using a small amount of polyol. The catalysts exhibited high thermal durability in lab-scale testing, proving that composite formation between Pt and Pd through this method is effective. The catalyst containing 50 % less PGMs than one prepared by an impregnation method was prepared and subjected for the purification of hydrocarbon and as a result, it was found that the catalyst had sufficient performance.

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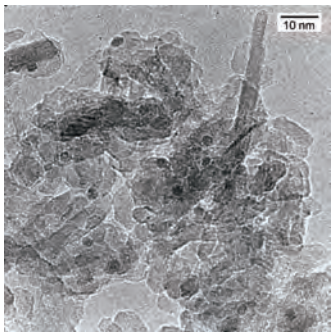
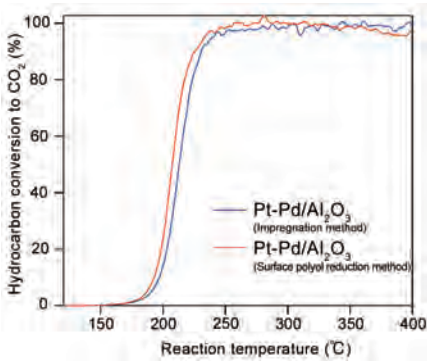



**TEM photograph of platinum nano-particles deposited on an alumina support**




**Hydrocarbon purification performance of catalysts prepared by an impregnation method and a surface polyol reduction method after a high-temperature thermal durability test**



# Organic semiconductor nanoparticles with several-nanometer thickness

## Continuous-flow production of nanoparticles for thin-film devices using a micromixer

We have developed a new process for continuous-flow production of very thin organic semiconductor nanoparticles by a reprecipitation method. Rapid mixing of an organic semiconductor solution with a poor solvent, that is, a solvent which cannot dissolve the organic semiconductor compound, through a micromixer with an inner diameter of 0.1 to 1 mm provided semiconductor nanoparticles stably dispersed in the solvent. Atomic force microscopy measurement showed that the nanoparticles have thin disk-like shapes with diameters of about 60 nm and thicknesses of several nanometers. We expect that the nanoparticles can be used for fabrications of layered thin films in organic solar cells and electroluminescent devices. This work was performed in collaboration with Konica Minolta, Inc.

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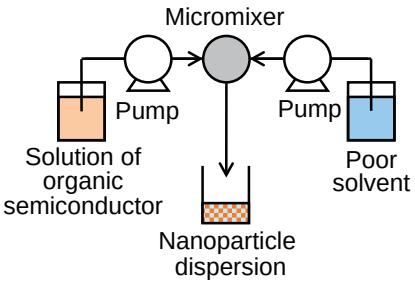
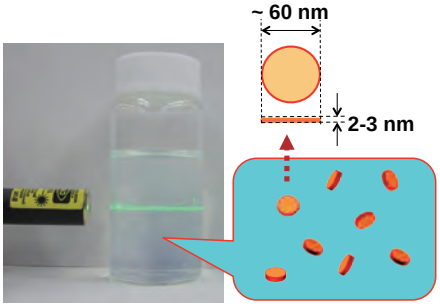



**Continuous-flow production of organic semiconductor nanoparticles**
Rapid mixing of poor solvent with a micromixer induces reprecipitation of nanoparticles.




**Dispersion of disk-like organic semiconductor nanoparticles**
Laser light is scattered by the nanoparticles.