

Preparation of metal catalysts for polymer electrolyte membrane fuel cell using supercritical carbon dioxide

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Synthesis of nano-sized metal catalyst particles has attracted a great deal of attention due to their unique physical and chemical properties, which makes them suitable for wide range of industrial applications. Nano size metal particles of controllable and uniform size contained in an appropriate support find uses in areas of catalysis, microelectronics, magnetics, electrochemistry and optics. In recent years, the synthesis of nanomaterials using supercritical fluids has become increasingly popular.

Metal particles on a carbon based substrate were synthesized by using a supercritical fluid. The substrates were impregnated with an organometallic precursor from a carbon dioxide solution in condition above its critical point. Adsorption process is performed at different pressure, temperature and process time. Reduction process is performed under supercritical condition and atmosphere condition with H₂ or N₂. The results of experiments were characterized by X-ray diffraction. Weight ratio. Results confirmed that the deposition using scCO₂ has a high surface area.