

3D porous Au film from dendritic fibrous nanosilica (KCC-1) for efficient CO₂ electrocatalysis

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Due to the environmental issue from increased concentration of carbon dioxide in the atmosphere, capturing and utilization of CO₂ is required. Electrocatalysis is one of the solutions for utilization of CO₂ by electrical energy. Among various materials for electrocatalytic CO₂ reduction, gold is the promising catalyst material which has high CO faradaic efficiency with low overpotential. However, it has low performance without surface modifications for many surface reaction sites and local pH effect of electrolytes. Herein, gold film which consists of uniformly coated 3D porous particles from the dendritic fibrous nanosilica (KCC-1) was fabricated. KCC-1 has an all directional opened pores because of uniform fibers from the center to outside. To utilize unique structure of KCC-1, gold e-beam evaporation method was conducted on KCC-1 coated wafer. Gold particles showed similar structure as KCC-1 which has improved surface reaction sites with local pH effect from the all directional opened pores.