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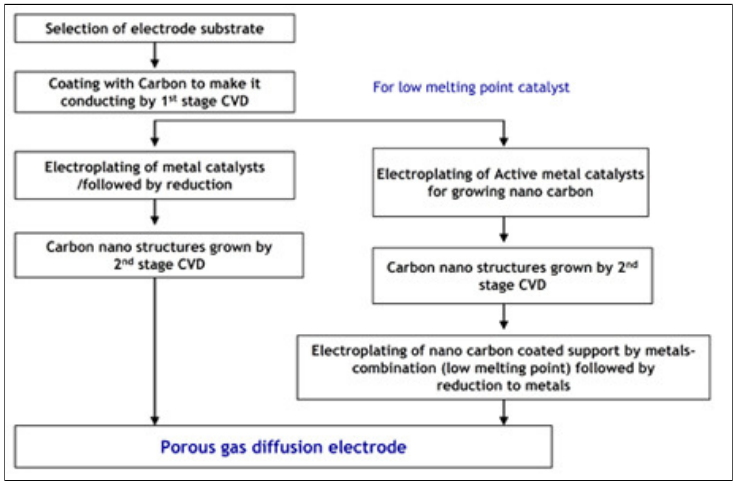
Enhanced by Coating

IITB has invented a process and novel material that is a carbon coated metal dispersion on porous substrates. The substrate is porous has high surface area on a carbon based electrodes that exhibits high current density >200mA/cm^2 and power density >250mW/cm^2 The invention involves metal dispersion on porous substrates providing high surface areas are widely used in heterogeneous catalysts, gas diffusion systems, chromatographic applications, and fuel cell electrodes. It also offers the coated device longer life and durability without loss of performance.



In the first stage of CVD the first furnace is used to vaporize carbon precursors such as natural precursors like camphor, turpentine oil, cashewnut shell etc, or petroleum based precursors like, C_2H2, C_6H_6, CH_4 etc., and the other furnace is used to pyrolyze the vapour. Temperature of first furnace is maintained above the vaporizing temperature of the precursors, while that of the second furnace, which contains the ceramic substrate, is maintained at pyrolysing temperature in the range 700^{o}C to 1000^{o}C. The carrier gas is selected from Ar, Ne, N_2, He and their like including hydrogen and ammonia gas carries the carbon vapour of the precursors from the first to the second furnace for pyrolysis. Pyrolyzed carbon is deposited over the selected ceramic substrate. The ceramic porous substrate is selected from pumice stone, Al_22O_3 pellets or porous Silicon substrate etc. After the 1st stage of CVD, different metals-combinations to function as catalyst (for Hydrogen electrodes the combination is selected from Ni, Pt, Pd, Fe, Co, Sn etc. and for oxygen electrode the metal combination is selected from Ag, Pt, Pd, Co, Al, Mg, Mn etc) in desired compositions are electroplated over the carbon coated porous substrate at current density of - 100mA/cm^2 to 700 mA/cm^2 followed by growing of carbon particles such as nanoparticles by a second stage CVD to obtain the desired end product. The coat was observed using TEM and electrode was subjected to tests. The resultant products gave very good results. A schematic is given.

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Inventors: Arup K Chatterjee, M Sharon, and R Banerjee