The study of a new porous nickel support for palladium alloy composite membrane

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A porous nickel support was successfully made by uniaxial pressing of nickel powder for metal support of Pd and/or Pd-alloy dense membrane. The used nickel powder prepared by pulsed wire evaporation (PWE) method had broad particle size distribution from 20 to 5,000 nm. From the pore characterization and SEM analysis, it was clarified that the fabricated porous nickel support had so small uniform pore size of 33 nm and very smooth surface so that it can be offered as new material for the substrate of palladium and/or palladium-based alloy membrane. As a result of single gas permeation test using H_2 and N_2, permeance was constant with increasing transmembrane pressure difference and the selectivity was around 3.7, which indicated that the gas permeation was contributed by Knudsen diffusion. Since it had thermal resistance up to 650℃, sputtering followed by cupper reflow could be applied to the formation of Pd alloy film on it. And it showed the defect-free dense membrane characteristic.