Pd alloy composite membrane deposite on a porous nickel support modified with diffusion barrier by sputtering method

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In this study, ceramic barrier was introduced on the surface of a porous nickel support (PNS) to prevent intermetallic diffusion. The ZrO2 was sputtered on the PNS by RF sputtering to be 200 nm. Pd and Au were deposited by DC and RF sputtering on the ZrO2 modified PNS with thicknesses of 4 μm and 0.5 μm, respectively. The permeation measurement was carried out using hydrogen and helium at 400 oC and a pressure difference of 100-2000 kPa. The gas permeation tests confirmed that the hydrogen permeation flux increased with increasing pressure difference to 3.33 mol m-2 s-1 at 2000 kPa with H2/He selectivity of 5600.