Ultrathin Pd-Ag coated on PBI-HFA membrane for hydrogen separation

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For pure hydrogen separation, deposition of palladium (Pd) and silver (Ag) on the PBI-HFA (based on 4.4' (hexafluroisopropylidene)bis(benzoic acid)) membrane was fabricated by electroless plating technique. The Pd/Ag ratio of the Pd-Ag membrane was controlled in the range of 10-20 wt.% by adjusting time of plating . After Pd-Ag deposition, alloying of Pd and Ag was successfully achieved at 400 °C for 10 h in hydrogen atmosphere due to easy inter-diffusion of two metals. Gas permeation properties were measured using H_2, N_2, CO_2 and CO at various temperatures ranging from 35 to 200 °C and at various pressure ranging from 0.4 to 0.8 MPa. Pd-Ag alloy membrane showed excellent permselectivity for hydrogen. The hydrogen permeation flux across the Pd membranes significantly enhanced by alloying.