

Development of alkaline water electrolysis membranes with high selectivity, high durability, and large dimension under load fluctuation

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Alkaline water electrolysis (AWE) is an electrochemical process to generate a high amount of hydrogen via water electrolysis under aqueous alkaline conditions. AWE membranes are key materials to determine both AWE performances and safety. Desirable AWE membranes should satisfy excellent resistance to harsh alkaline chemicals and heat, high hydroxide ion conductivity, and extremely low gas permeability, particularly to hydrogen. In this presentation, three types of AWE membranes operated under different alkaline atmospheres will be introduced. These membranes include porous membranes with controlled pore characteristics, chemically durable anion-conducting perfluorinated ionomer membranes, and thin-film composite membranes with low hydrogen permeability. In addition, organic-inorganic hybrid concept will be presented to improve their electrochemical performances and service life further.