ALTERNATIVE ENERGY SOURCES

Tuning of hydrophilic nature of the synthesized composite membrane for energy devices

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Abstract

Presently composite membranes playing a vital role in energy devices due to its energy demand. Present work investigates water transport properties in Nafion and PTFE membrane. In polymeric membranes water management is very essential parameter in membrane electrode assembly (MEA) for Proton transport. Water uptake mainly depends on membrane characteristics either hydrophobic or hydrophilic. By using chemical treatment PTFE support hydrophilicity can improved [1]. By using contact angle analyser (goniometer) surface nature was observed. After surface treatment contact angle changed to 135° to 58°. Optimized surface nature of PTFE support observed after so many trials. It's observed water uptake of PTFE is 30.65% and Nafion 117 was 29.6%. It's clearly indicating PTFE support hydrophobic nature changed to hydrophilic after surface treatment. More water uptake leads to membrane swelling and flooding happens between electrodes. Insufficient water leads to formation of intermediate products and degradation of membrane and inducing stresses in membrane electrode assembly (MEA).

Keywords: composite membrane, PTFE support, Contact Angle, water uptake

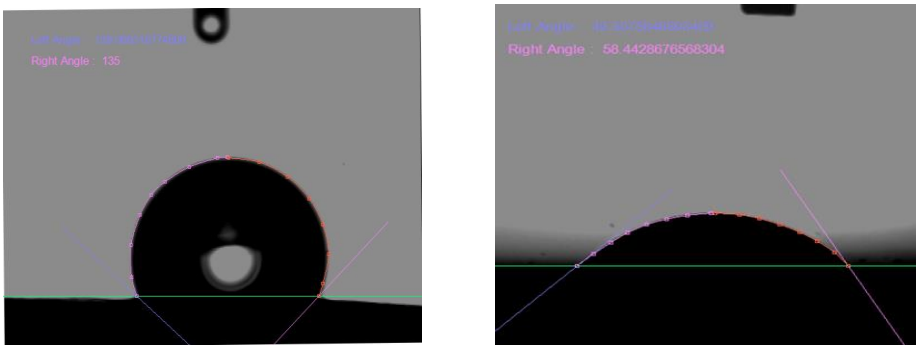

Fig. Contact Angle PTFE support

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