The Importance of Water Exposure Time and Uniform Seed Layer for High-Performance LTA Zeolite Membrane

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Linde type A (LTA) zeolites are used for dehydration process because of their pore size and hydrophilicity. For synthesis of high-performance LTA membranes, parameters related to seed layer deposition and water exposure time is important factor. This study, we confirmed effects of water exposure time and conditions of seed layer deposition on LTA membranes. When LTA membranes were immersed in water for ~12 h, LTA membranes showed high separation performances. but as the water exposure time increased, pinholes were created on the surface of the membranes due to dealumination. Finally, the separation performances of LTA membrane were sharply degraded after a critical water exposure time(~100-200 h). Fluorescence confocal optical microscopy revealed that changes of zeolite membrane structure of LTA membranes during water exposure time. We also confirmed the effect of conditions of seed layer deposition. Waiting time of seed suspension reduced aggregated particles in seed suspension. So, after appropriate waiting time of seed suspension, uniform seed layer was deposited on the support. Also, appropriate numbers of dip-coating were important for deposition of uniform seed layer.