

Development of lateral flow membranes for immunoassay separation

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ABSTRACT

The lateral flow nitrocellulose membrane is one of the commonly used separation media for bacteria detection in drinking water treatment facilities. In order to enhance its performance, control of the membrane surface and cross-section morphology is primarily important. The challenge of this study is to combine various formulations and casting variables to obtain lateral flow nitrocellulose membranes with the desired morphologies. Through the dry-phase inversion method, the drying temperature was found to be an important parameter in synthesizing membranes as it affects pore structures. A high drying temperature causes agglomeration of the polymer matrix, and thus smaller pores were observed on the membrane surface. This further decreases the membrane lateral liquid migration rate, besides reducing the membrane binding ability for bacteria detection. Results show that by decreasing polymer concentration, membrane surface pores became apparently larger, thus creating a faster lateral migration speed of the water solution. A larger pore size increases the chance for the bacteria detecting agent to bind onto the pore layers, which ultimately enhances the bacteria detection ability of the device.

Keywords: Membrane; Morphology; Microfiltration; Binding ability; Lateral flow

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