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A Facile Method to Quantify the Carboxyl Group Areal Density in the Active Layer of Polyamide Thin-Film Composite Membranes

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Abstract

Polyamide thin-film composite (TFC) membranes are the industry standard for membrane-based desalination. Negatively-charged carboxyl groups in the polyamide selective layer play an important role in membrane performance, affecting ion permeation, fouling, and scaling. As such, simple and accurate quantitation of the carboxyl group density is needed. While several methods already exist, each has important drawbacks that limit its application. In this study, we develop a simple bind-and-elute method utilizing silver ion probes, with silver quantitation performed using inductively coupled plasma mass spectrometry. First, the efficacy of the binding, wash, and elution steps is verified, most

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