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# Detailed, real-time characterization of particle deposition during crossflow filtration as influenced by solution properties

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**Abstract**

The detailed structures and distributions of the deposit layer formed during cross-flow filtration of 0.4 μm polystyrene particles has been investigated. A new filtration system was used to directly visualize particle deposition on the membrane surface in a filtration channel in real time. High-resolution and time sequenced images were obtained as well as 3D views of the filtration channel. The structural differences of the deposit layer over a range of solution conditions (pH, ionic strength, and feed concentration) were determined to yield new insight into the fouling mechanism. The time-dependent deposition behaviour was characterized on the basis of surface coverage, deposition volume and normalised deposition volume. The initial deposition process was primarily governed by membrane-particle interactions, while the characteristics of the fully developed deposition layers were mainly affected by particle-particle interactions.



## Introduction

Membrane filtration has been widely used in many industries as a separation technology. However, the issue of membrane fouling significantly restricts the filtration performance [1-5]. Membrane fouling due to particle deposition during filtration processes has been shown to be influenced by a wide range of factors such as solution and suspension properties (pH, ionic strength, and feed