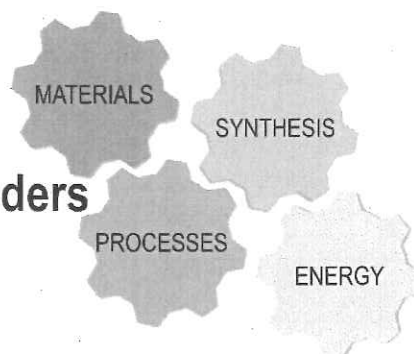


Chemical Research in Flanders

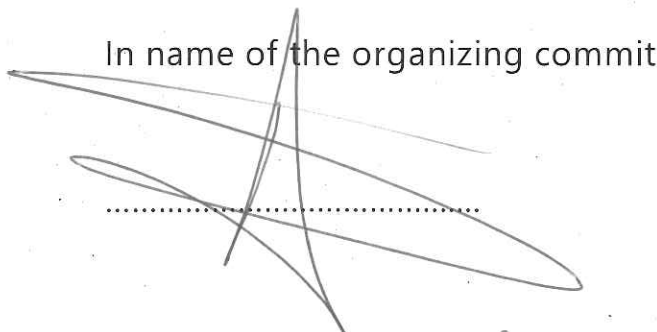
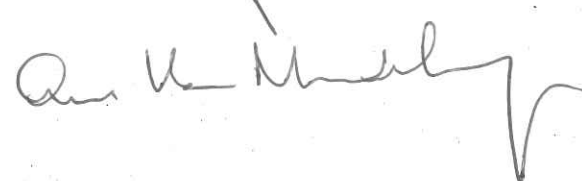


CRF-2 2019

.....*Indah Prihatiningtyas*.....

has attended the CRF-2 Symposium

In name of the organizing committee


.....


October 14-16 2019

Prof. Chris Stevens
Prof. Johan Martens

Incorporating cellulose nanocrystal (CNCs) in pervaporation membrane to enhance performance of desalination

Indah Prihatiningtyas, Alexander Volodin, Bart Van der Bruggen

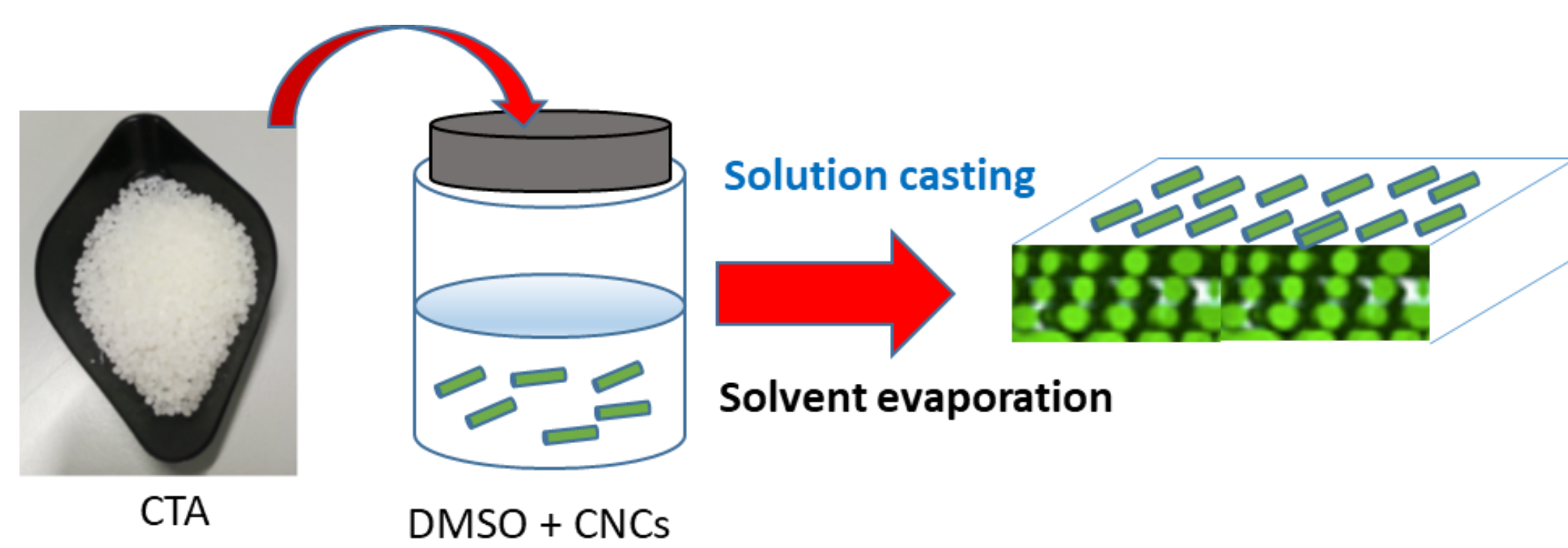
E-mails: indahprihatiningtyas.yamsidi@kuleuven.be; bart.vanderbruggen@kuleuven.be

Background

Pervaporation (PV) is highlighted in recent research as an attractive and promising membrane process for desalination. However, the permeability is thought to be low for practical application. Incorporating a hydrophilic nanofillers to develop a composite membrane potentially improves the productivity, selectivity and thermochemical durability of a membrane. CNCs are a renewable material with low cost and thought to be attractive for reinforcing polymers and increasing the hydrophilicity of nanocomposite materials. In this study, nanocomposite membranes were prepared by incorporating CNCs into cellulose triacetate (CTA) by solution casting in order to enhance the performance of pervaporative desalination. The resulting membranes were characterized by scanning electron microscope (SEM), atomic force microscope (AFM), water contact angle, tensile strength, and Fourier transform infrared (FTIR) spectroscopy. The desalination performance by vacuum pervaporation was investigated as a function of CNCs loading, feed temperature (30 and 70° C) and feed concentration (from 30 g/L to 90 g/L NaCl).

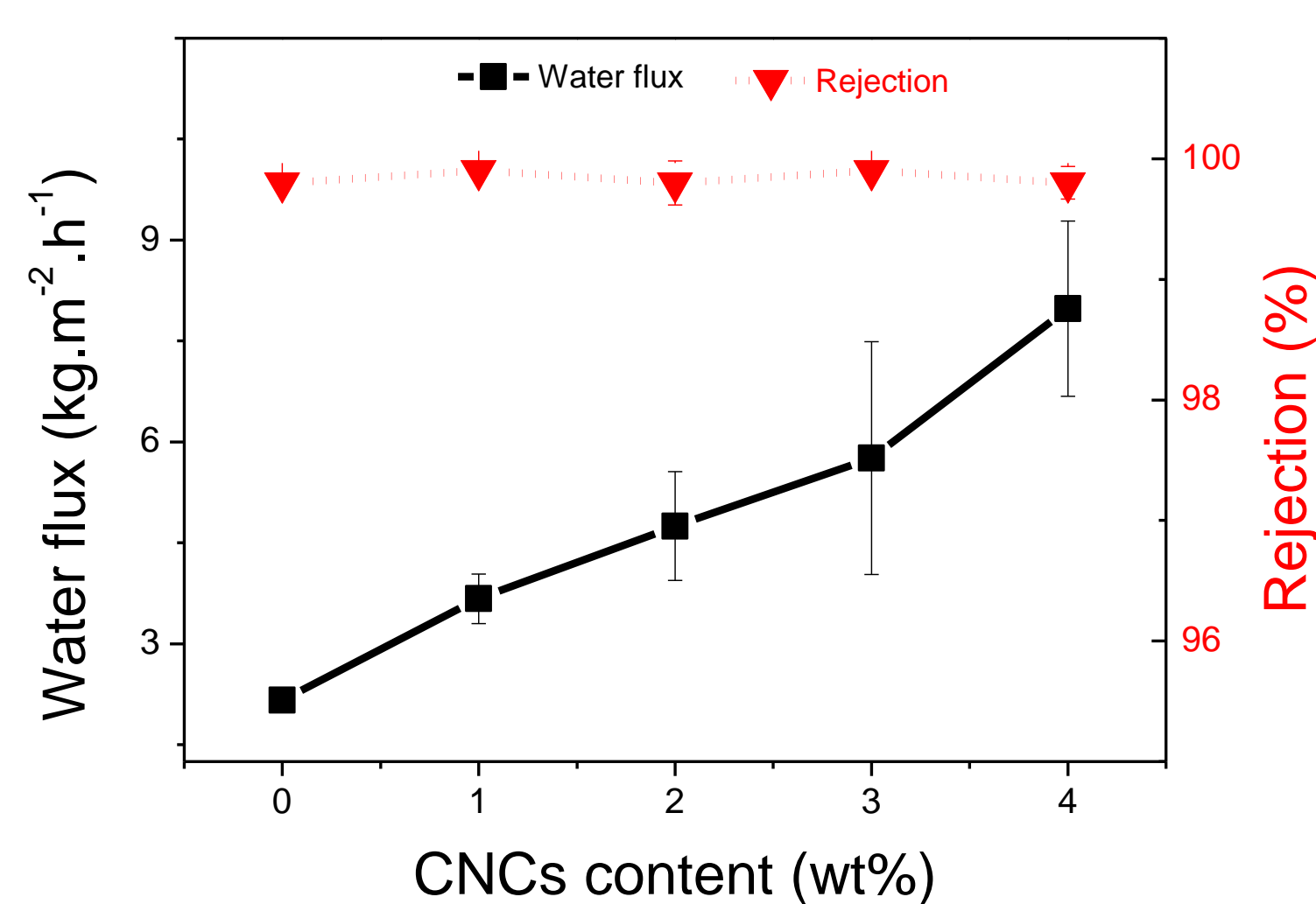
Methods

CTA/CNCs nanocomposite membranes (prepared via solution casting)

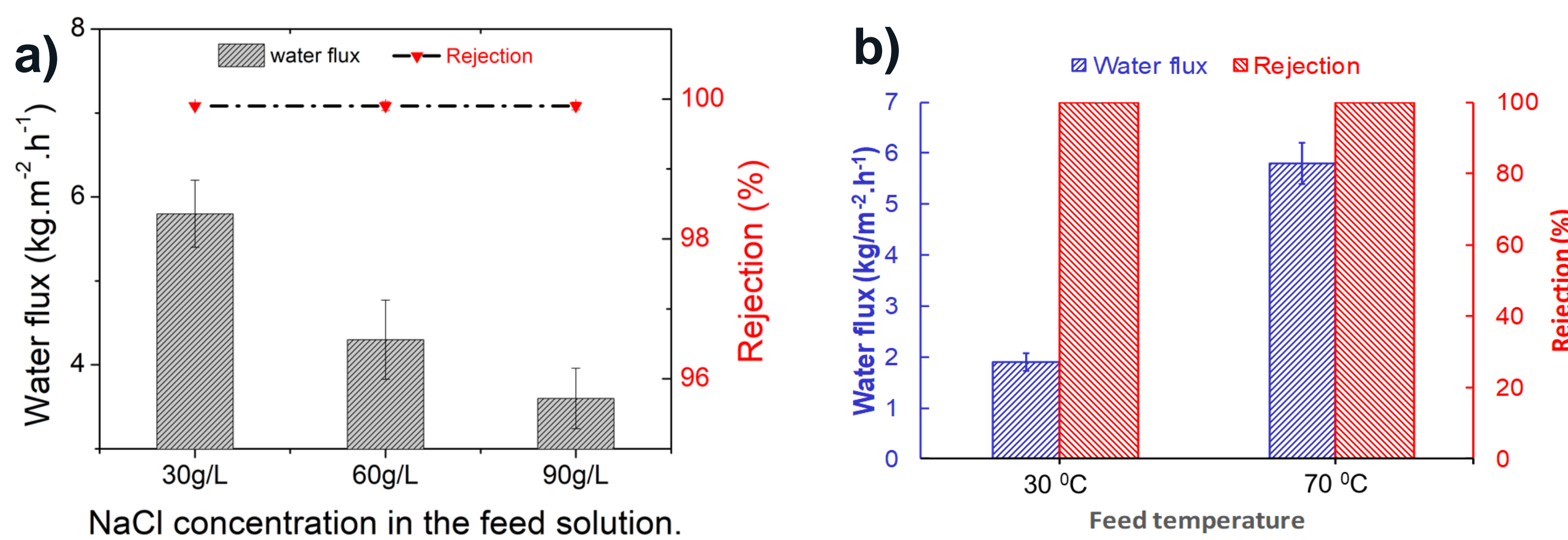


Results

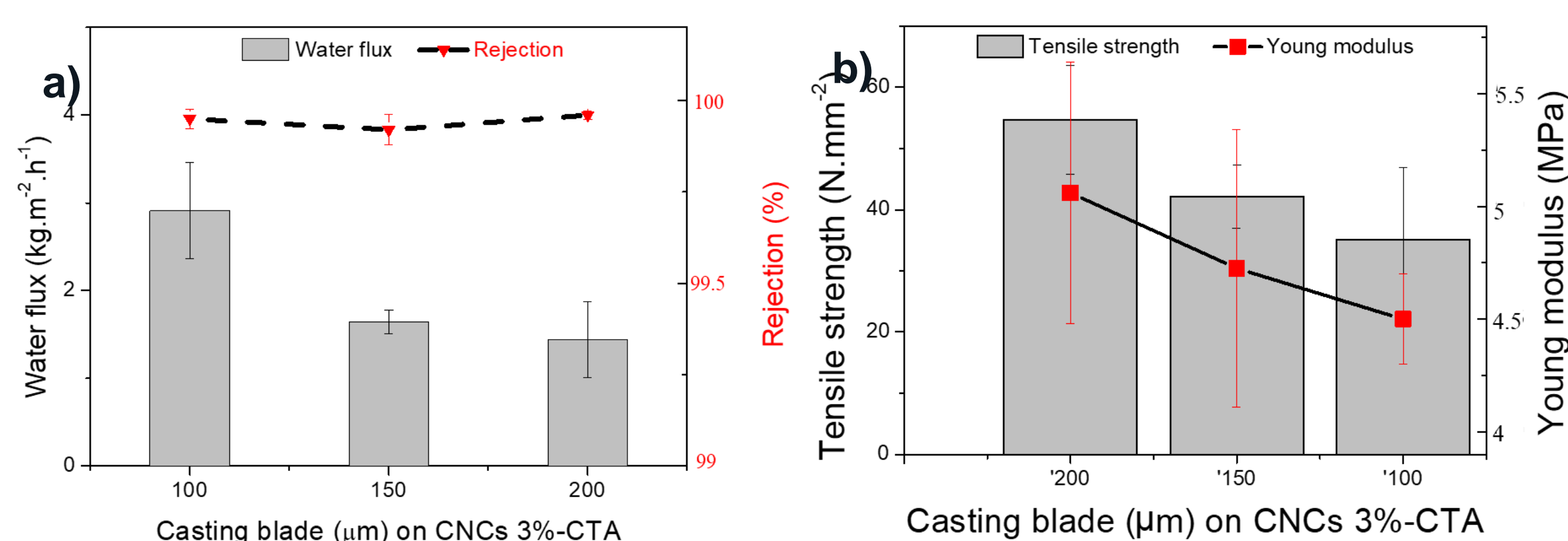
Performance of CTA/CNCs nanocomposite Membranes in pervaporation



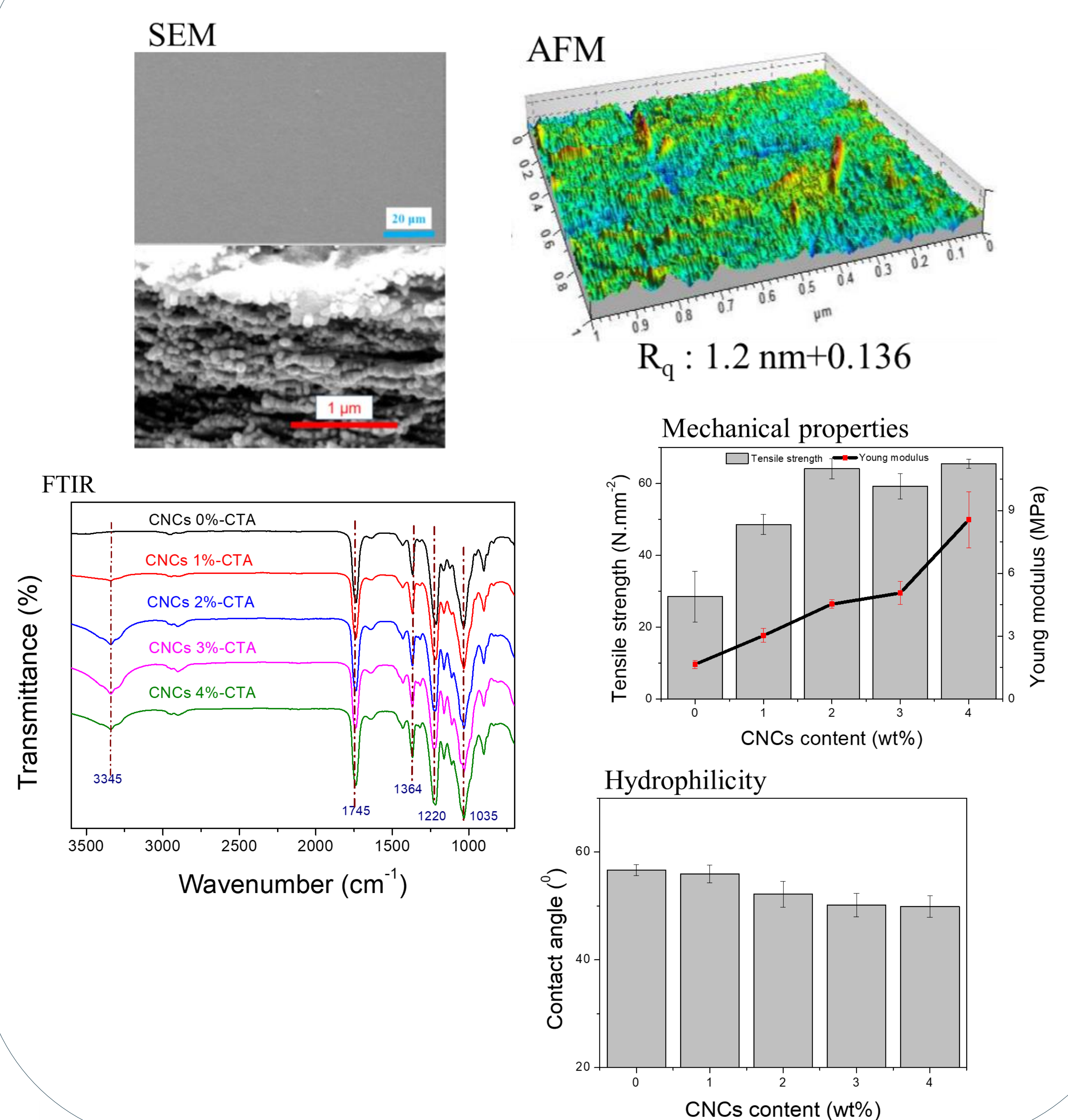
Performance of CTA/3%-CNCs (200µm)



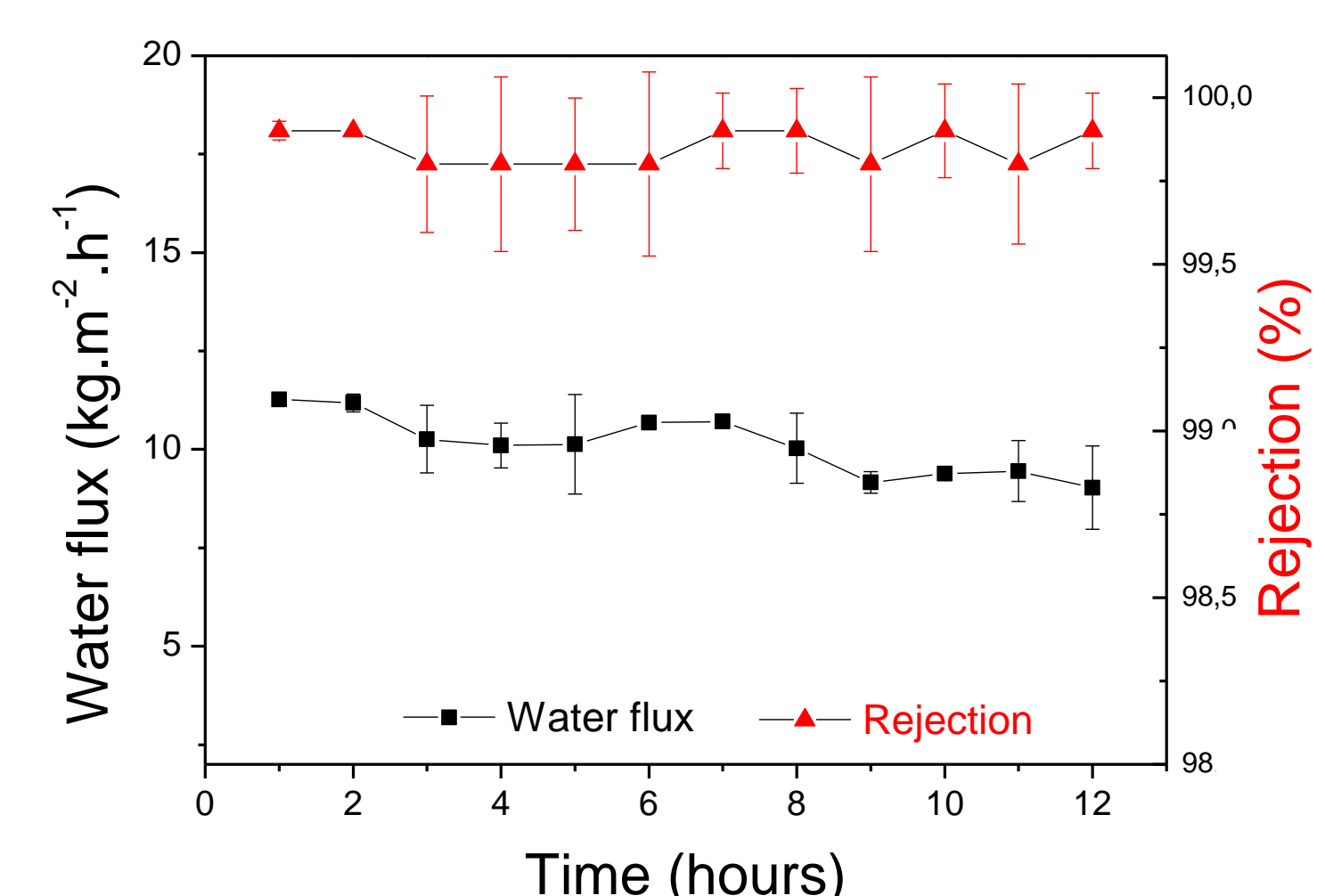
Effect casting blade height



Membrane characterization



Performance of CTA/3%-CNCs as a function of exposure time at 100 µm of casting blade height



References :

*Prihatiningtyas, I., Van der bruggen, B., Volodin, A. "Cellulose nanocrystal as organic nanofillers for cellulose triacetate membranes used for desalination by pervaporation", Industrial & Engineering Chemistry Research, 2019, 58 (31), 14340-14349.