



**VICTORIA UNIVERSITY**  
MELBOURNE AUSTRALIA

*An autopsy study of a fouled reverse osmosis membrane element used in a brackish water treatment plant*

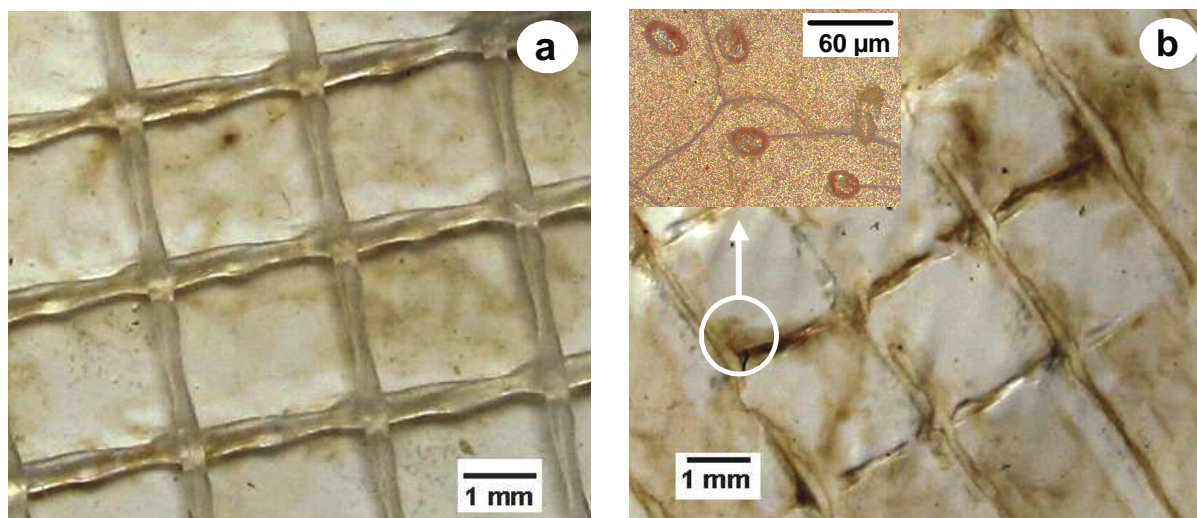
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Gray, Stephen, Tran, Thuy, Bolto, Brian, Hoang, Manh and Ostarcevic, Eddy (2007) An autopsy study of a fouled reverse osmosis membrane element used in a brackish water treatment plant. *Water Research*, 41 (17). pp. 3915-3923. ISSN 00431354

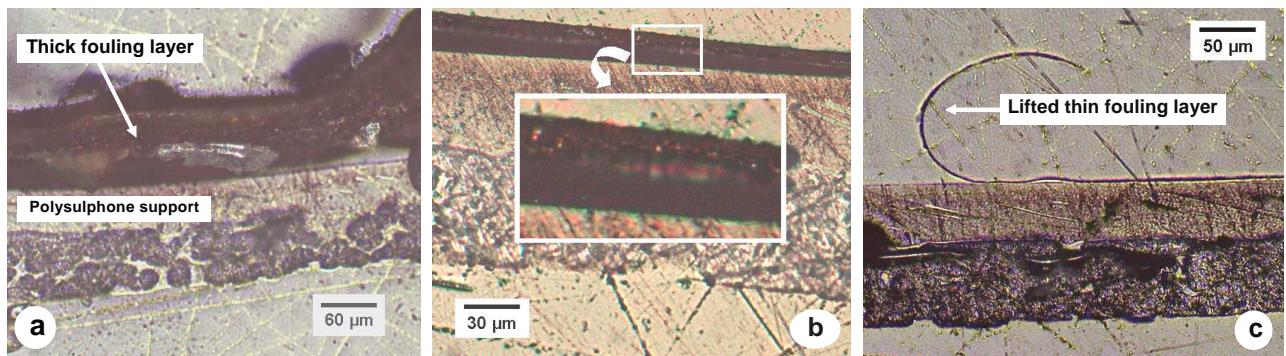
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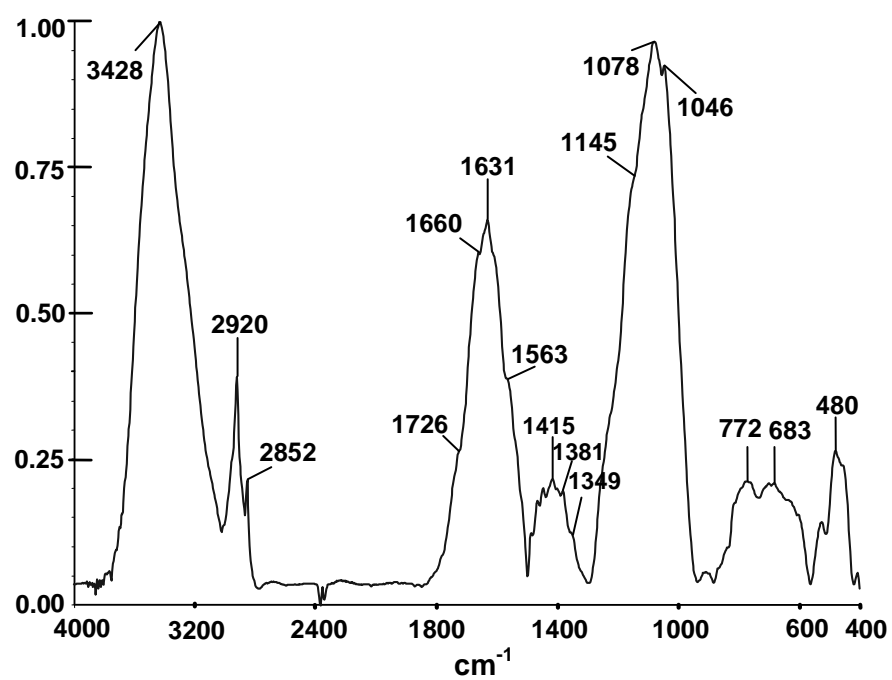
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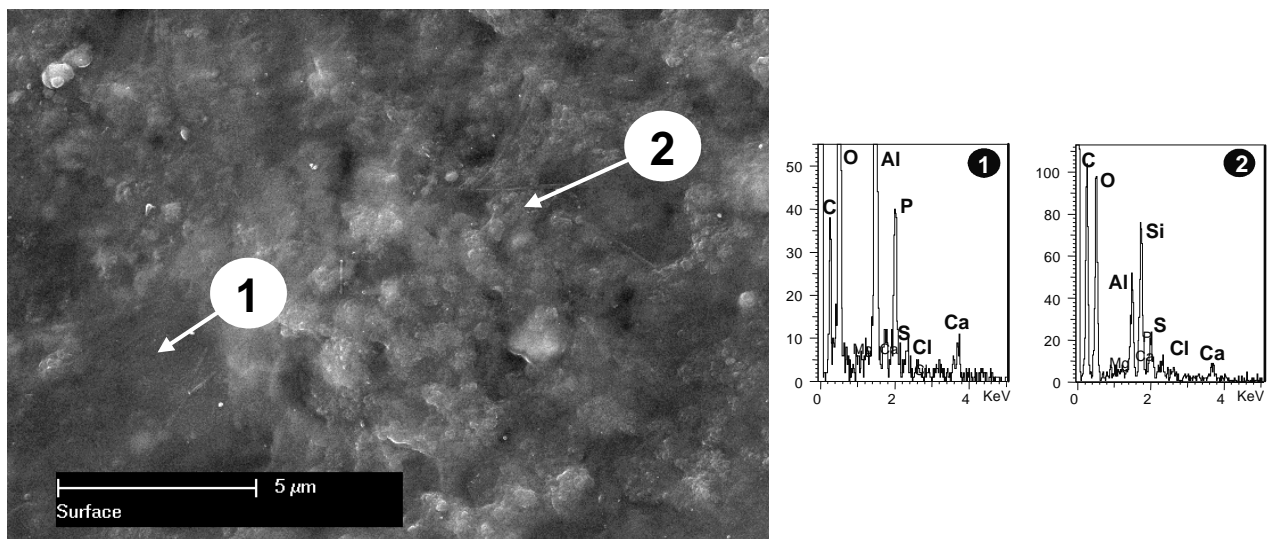
**Figures 1a and b:** Optical images of the membrane surface before (a) and after (b) the feed spacer was removed.



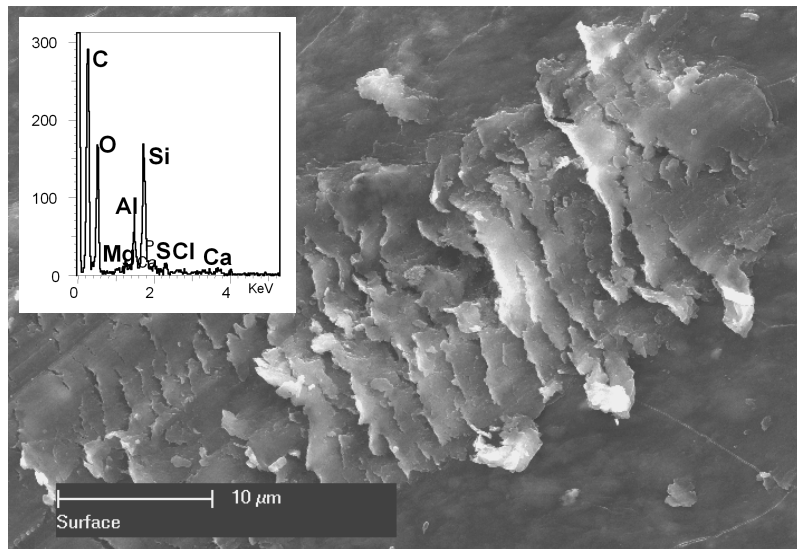
**Figures 2(a), (b) and (c):** Optical images showing: (a) a thick fouling layer in regions near the spacer strands; (b) and (c) fouling layer with varying thickness in regions located further away from the strands.



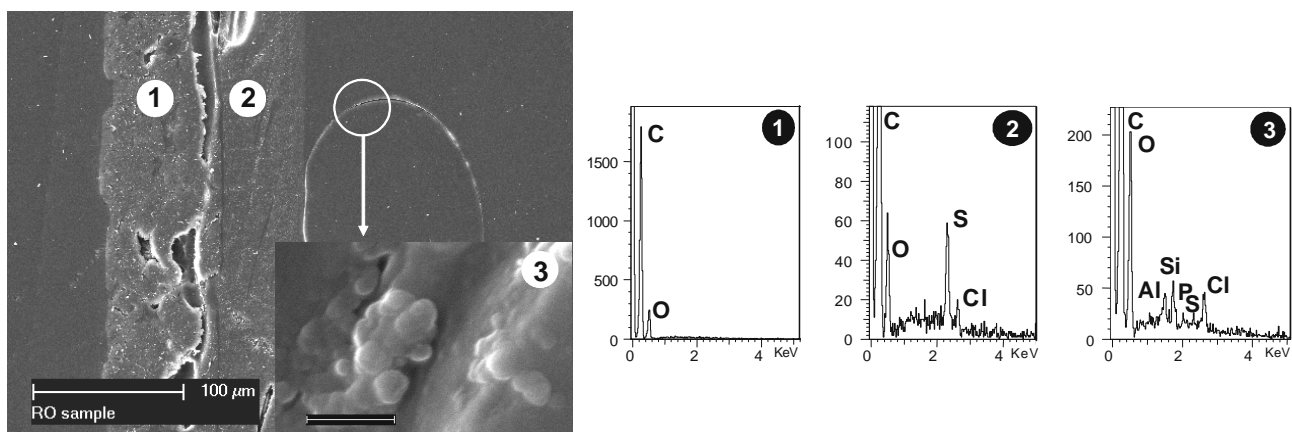
**Figure 3:** FTIR spectrum of the fouled membrane extract.



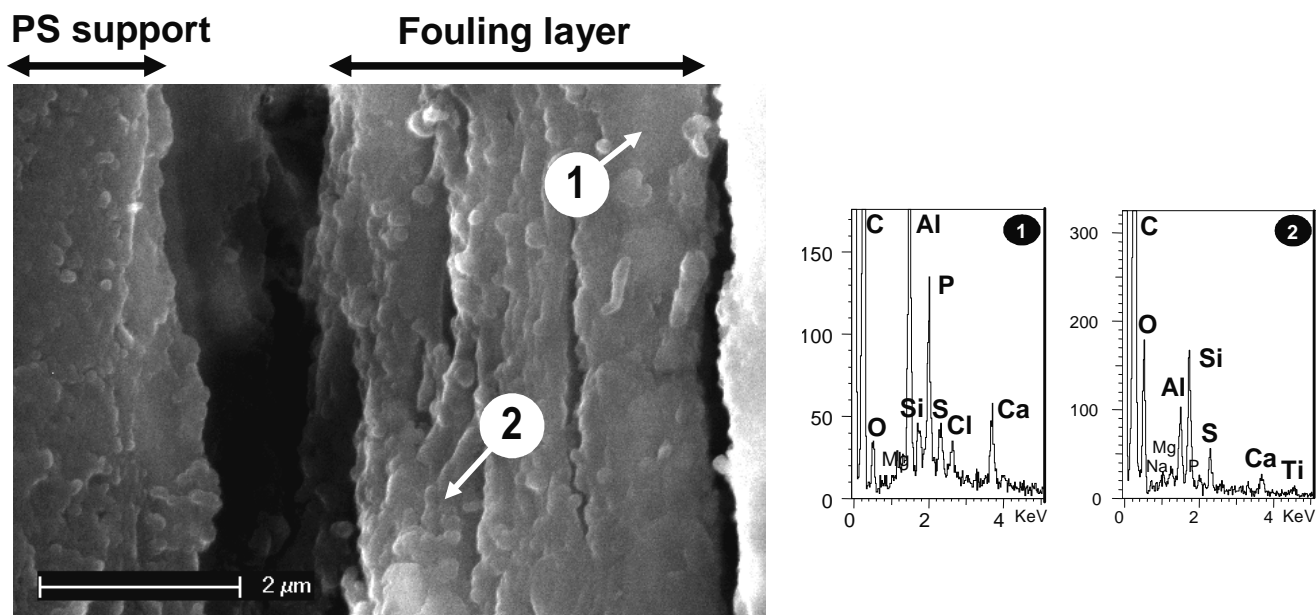
**Figure 4:** SEM micrograph and associated EDS showing particulate matter embedded in an amorphous matrix.



**Figure 5:** SEM micrograph and associated EDS showing aluminium silicate scaling.

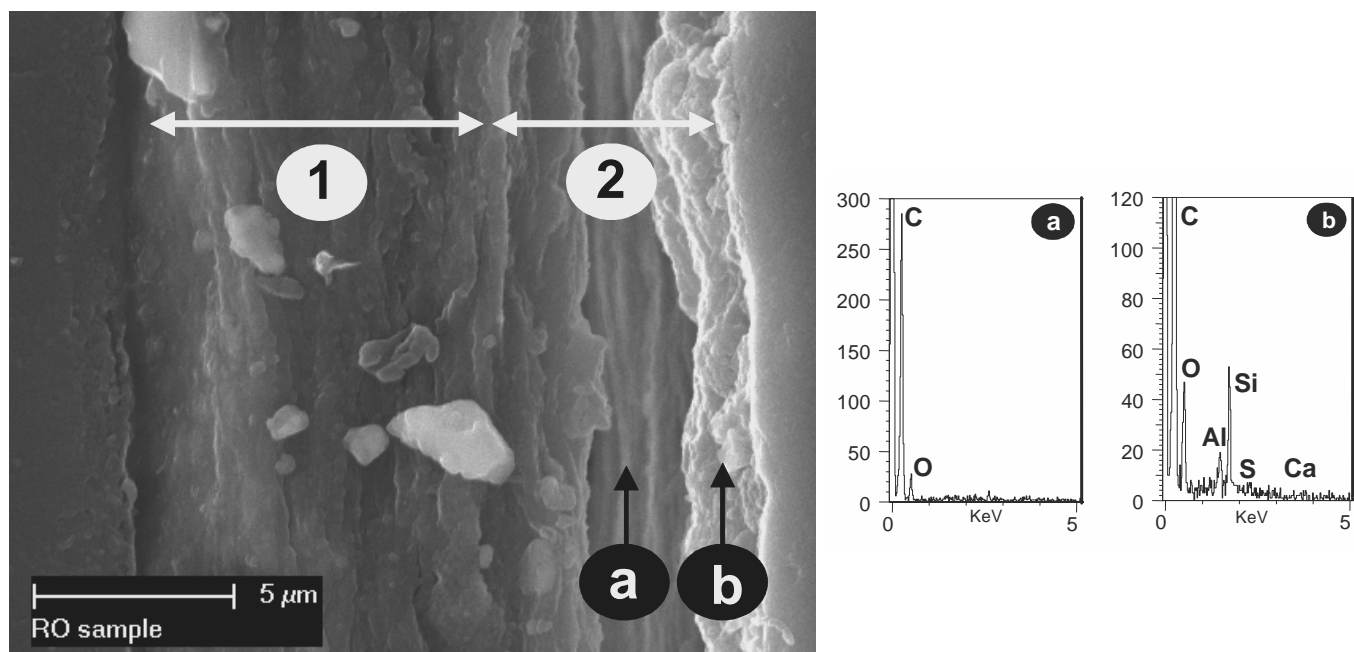


**Figure 6:** SEM micrographs showing a thin fouling layer at different magnifications and associated EDS analyses. Bar (inset) = 500 nm.



**Figure 7:** SEM micrograph and associated EDS analyses showing a thicker fouling layer.





**Figure 8:** SEM micrograph showing two distinct Regions (1 and 2) of a thick fouling layer and EDS analyses of the inner amorphous (a) and outer crystalline (b) layers of Region 2.