

Development of Barrier Properties with Increasing Microfibrillated Cellulose Coat Weight

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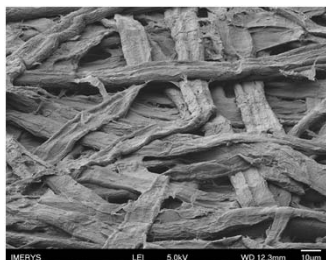
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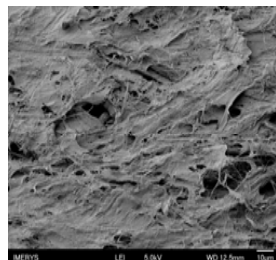


Microfibrillated Cellulose in Barrier Applications

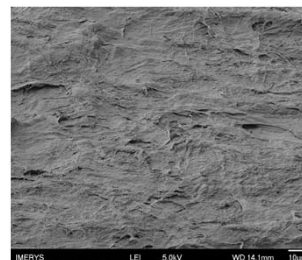
- Fiberlean Technologies Ltd make microfibrillated cellulose (MFC) from pulp through a mechanical grinding process
- MFC has a high surface area and aspect ratio compared to untreated cellulose and as a result it can form dense, nonporous films. (Lavoine *et al*, 2012 and Kumar *et al*, 2014)
- These films can be excellent barriers to oil, oil vapour and oxygen. (Lavoine *et al*, 2012 and Kumar *et al*, 2016)
- MFC layers ranging from 1-8 g m⁻² were coated onto handsheets via vacuum filtration through a freshly formed sheet
- Heptane vapour transmission rate was measured by clamping a sheet over an aluminium pot containing 8 mL of heptane and weighing at regular intervals over 6 hours



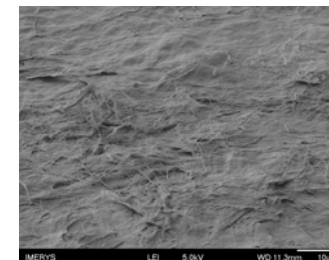
Base sheet- no MFC



2 g m⁻² MFC

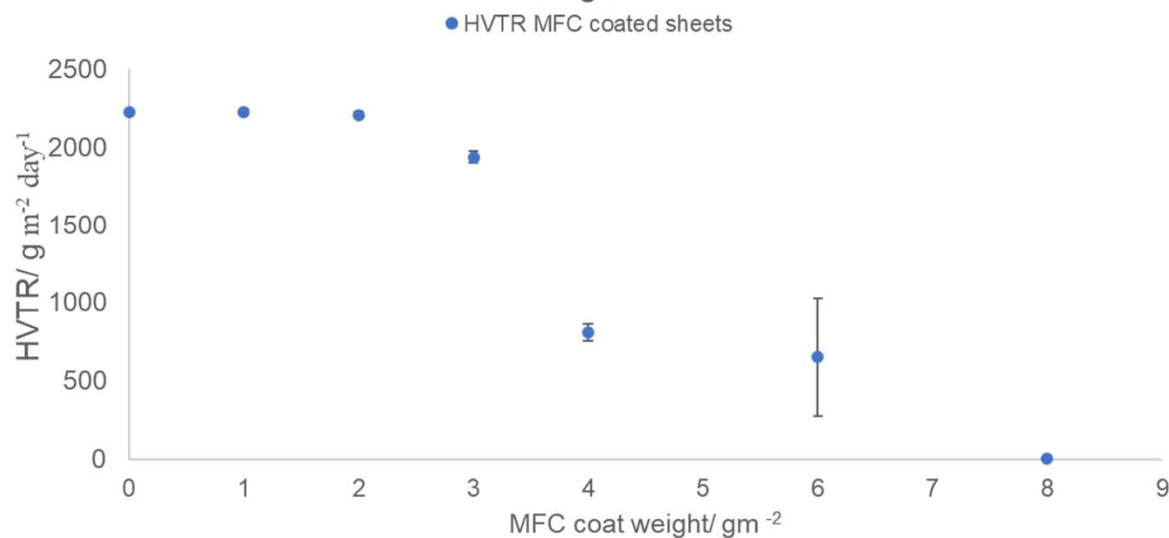


3 g m⁻² MFC



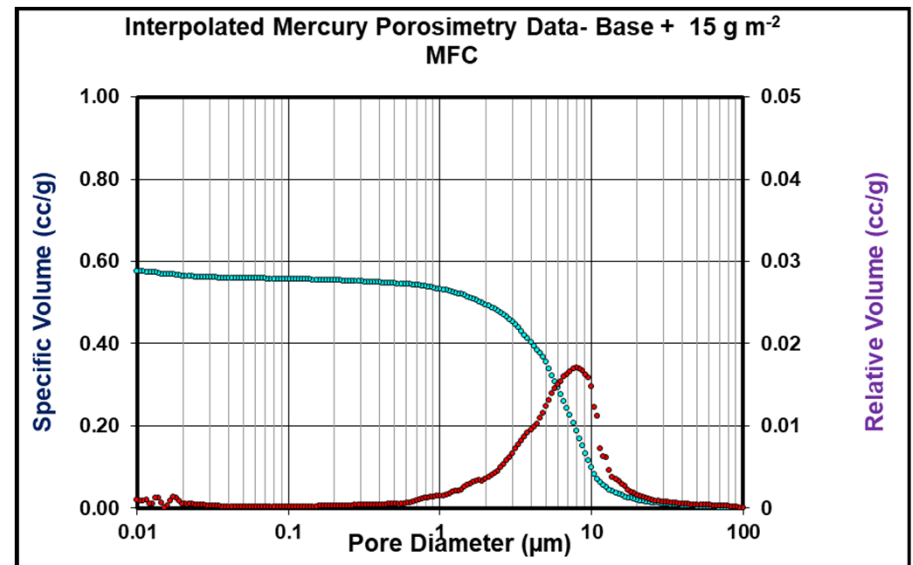
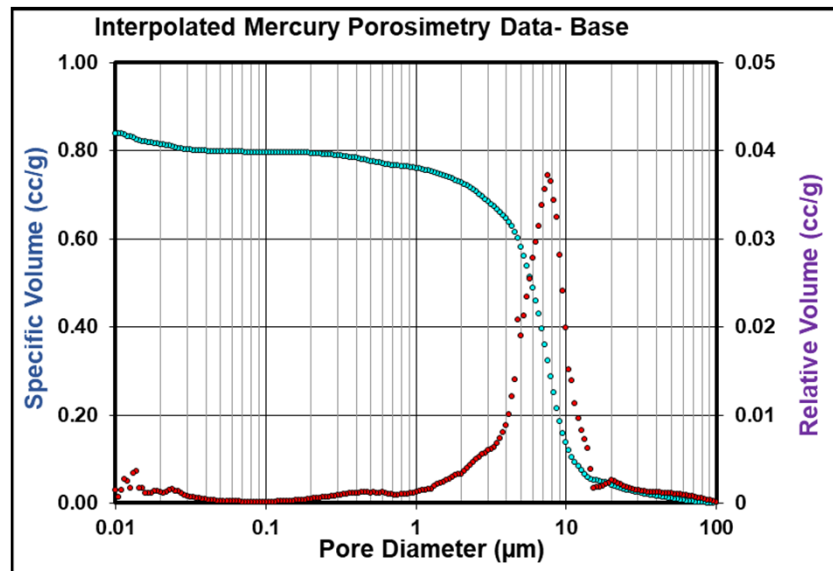
8 g m⁻² MFC coating

Heptane vapour transmission rate of sheets vs MFC coat weight



Mfc coating	Number of samples	Standard Error
g m ⁻²	#	g m ⁻² day ⁻¹
0	2	12.97
1	3	19.7
2	3	18.69
3	3	39.6
4	3	52.4
6	2	375
8	3	0.25

Mercury porosimetry analysis of base and MFC coated sheet



- No additional peak observed in the pore size distribution curve for the MFC coated sheet- this suggests that the MFC layer had very little porosity and may help to explain why it forms such effective barrier layers.

Thank you for your attention
Questions?

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