

ULTIMATE



WATER SMART INDUSTRIAL SYMBIOSIS

CS7 – Tain (Glenmorangie distillery)



Meeting: October, 30th 2020



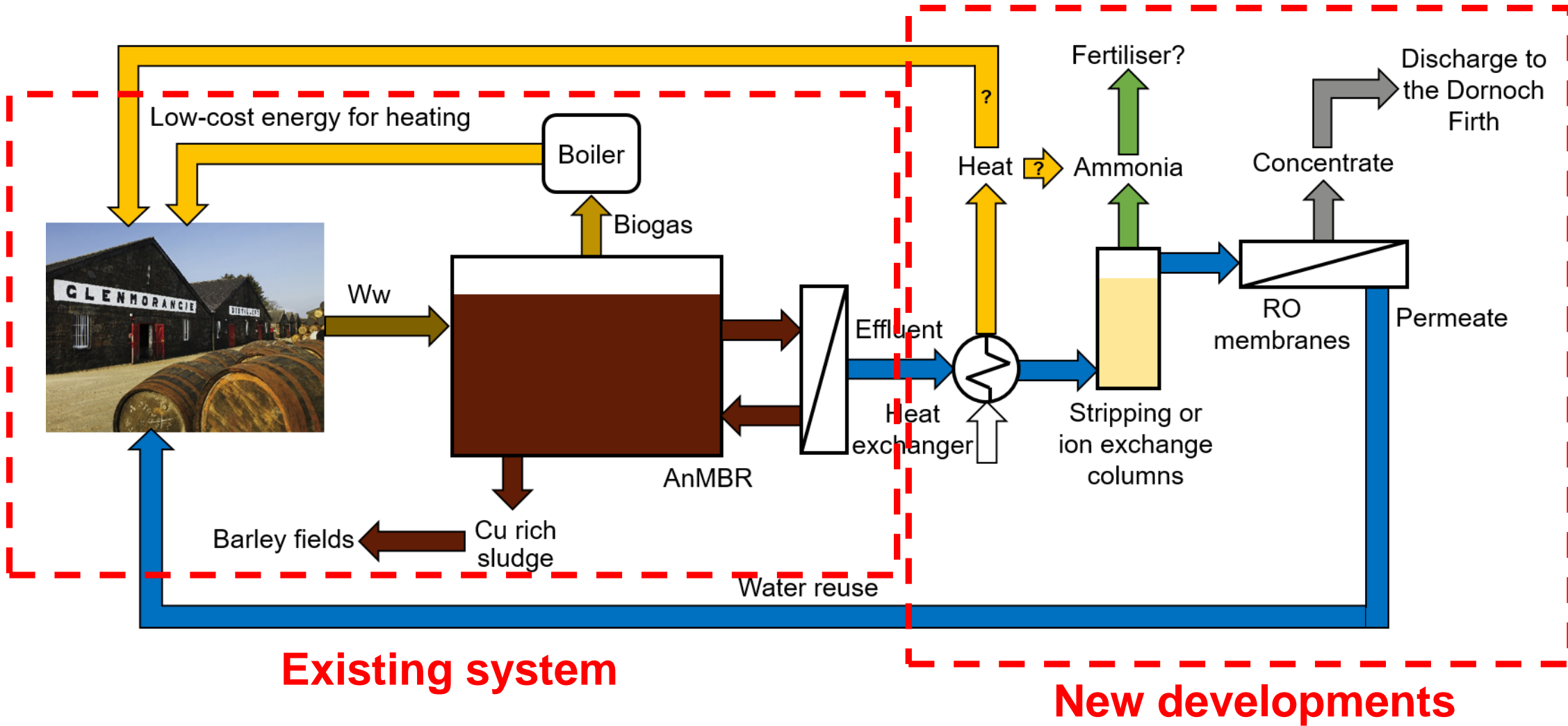


CS7



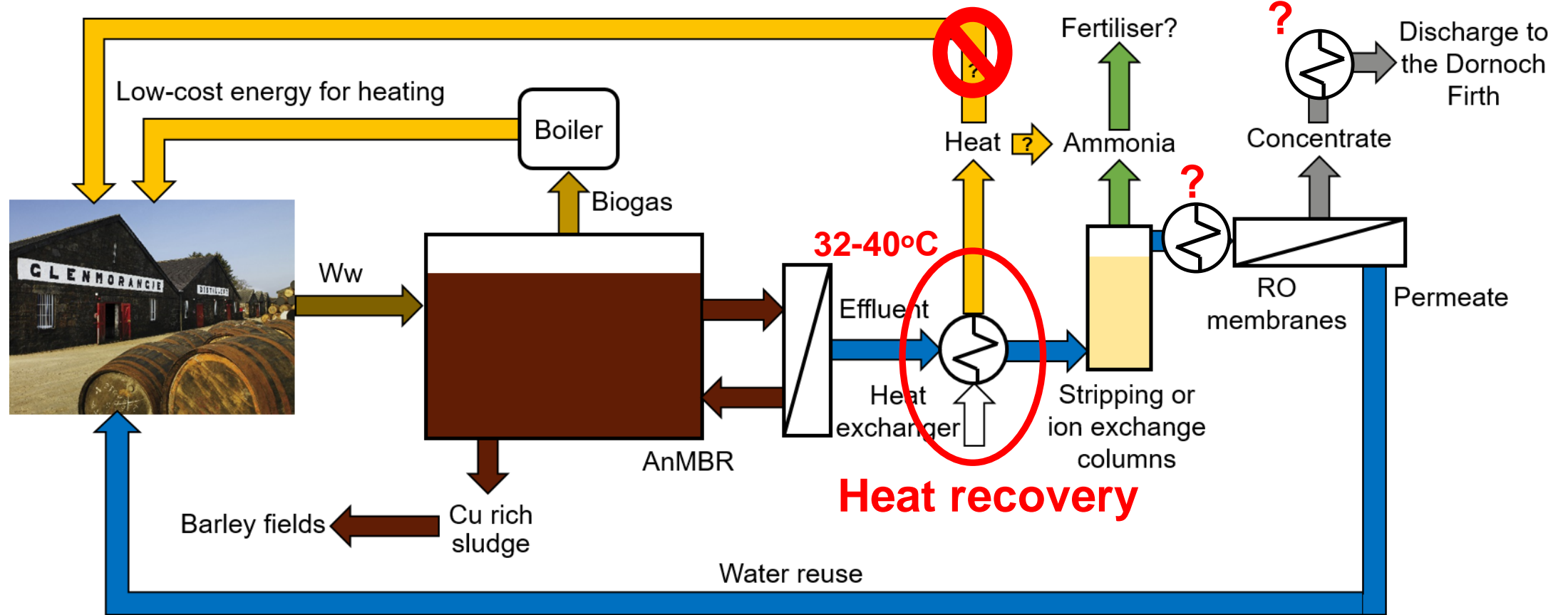


Treatment systems





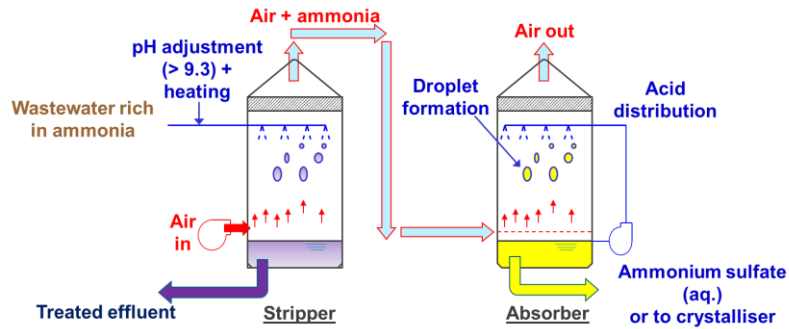
Treatment systems



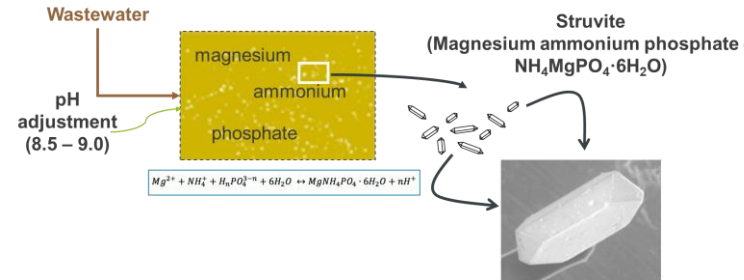


Impact of temperature: Ammonia recovery

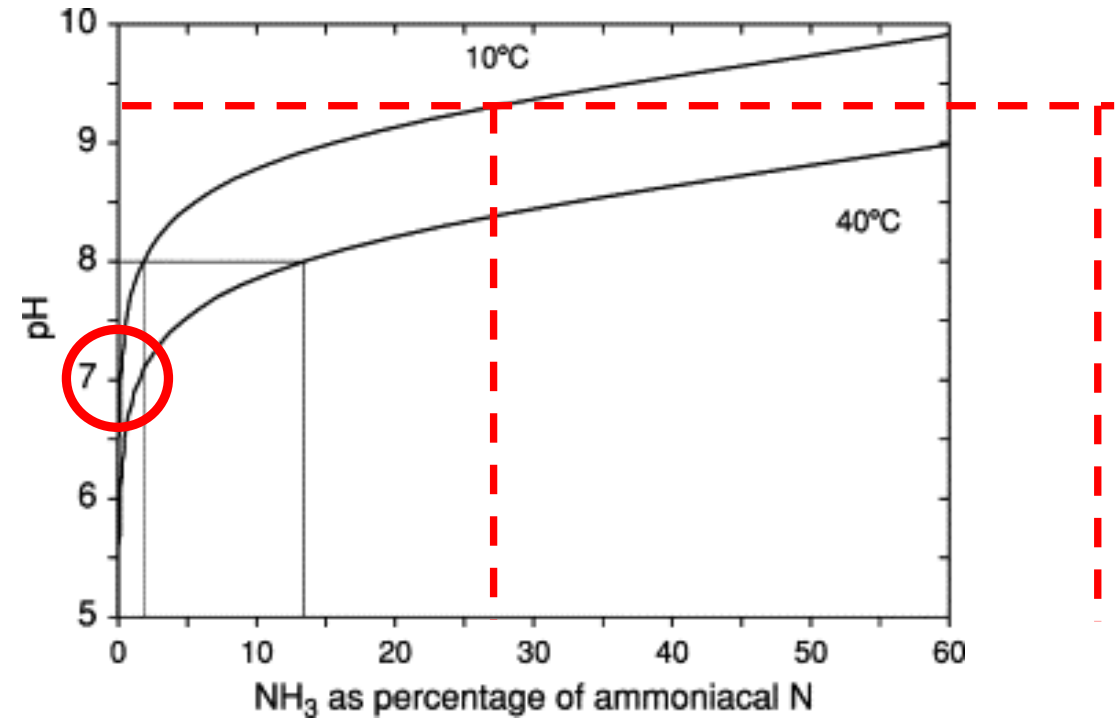
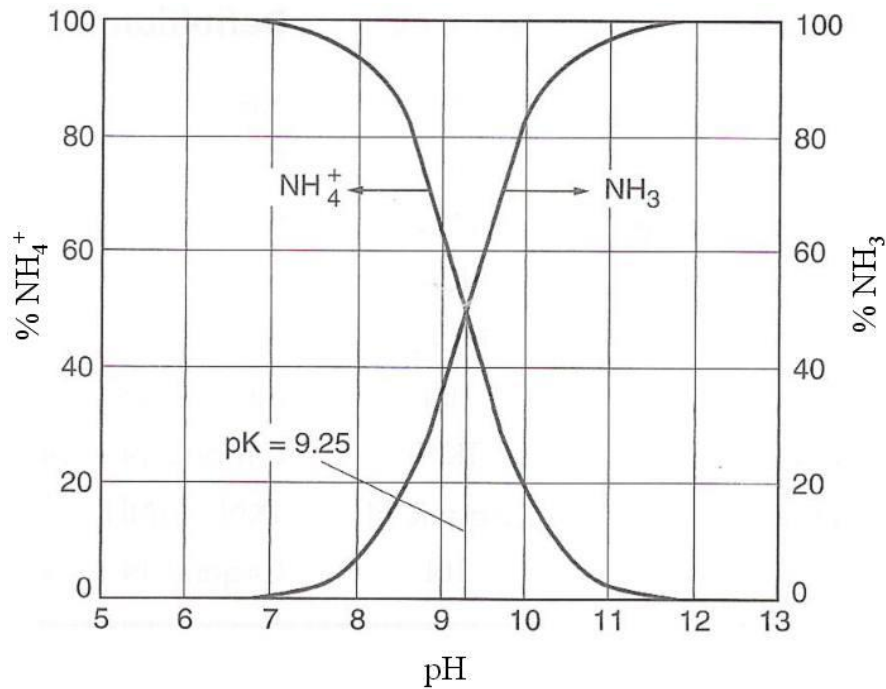
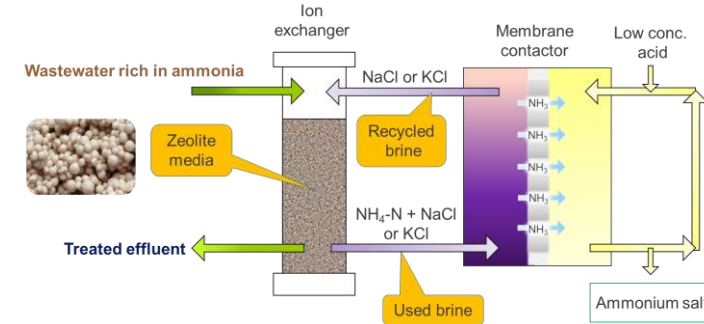
Stripping



Precipitation



Ion exchange





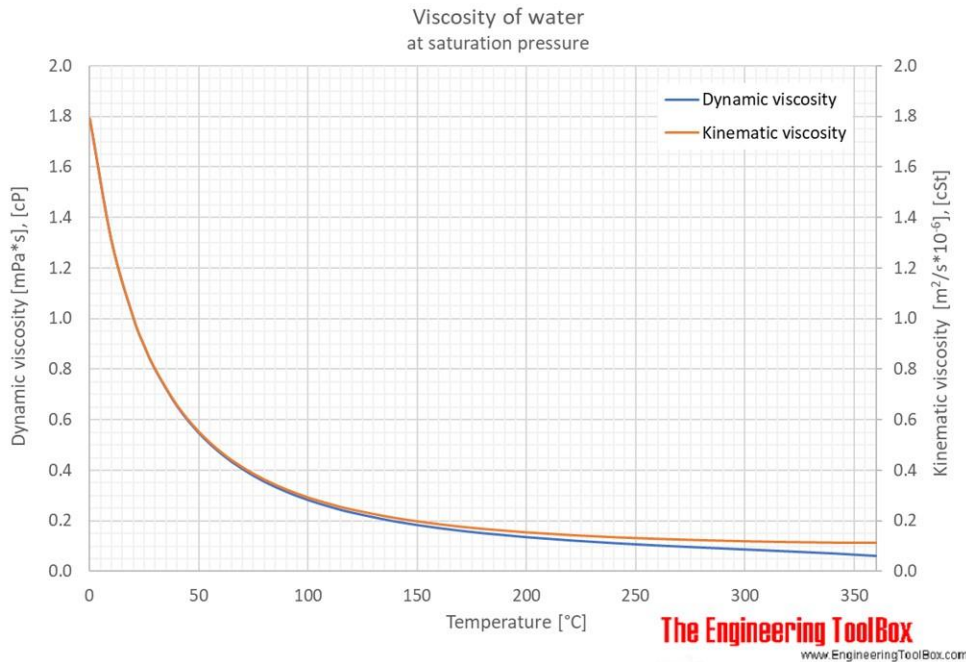
Impact of temperature: RO membranes

Flux $J = \frac{Q_p}{A} = \frac{P - \pi}{\eta \cdot R}$

Pressure

Resistance

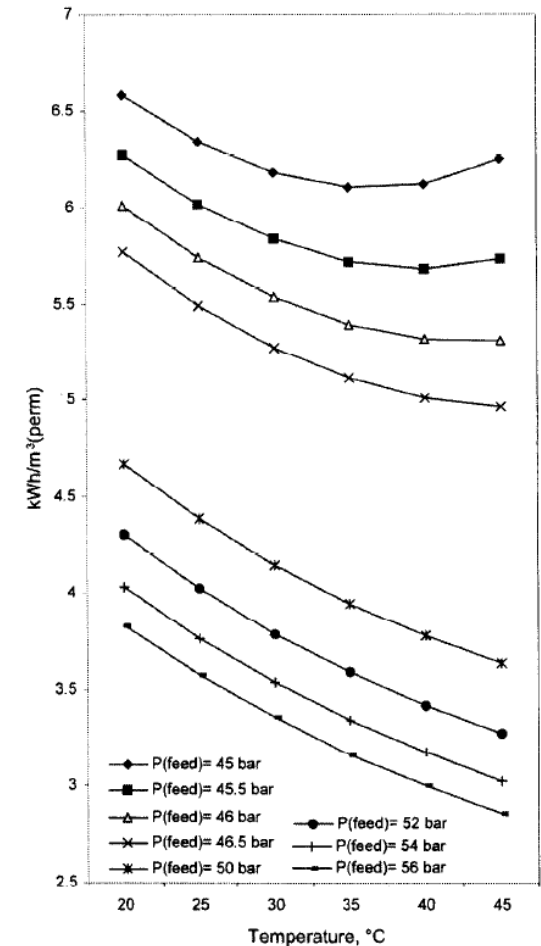
Viscosity



https://www.engineeringtoolbox.com/water-dynamic-kinematic-viscosity-d_596.html

Temperature, °C	TDS, mg/l	Pressure, bar
5	12	27.3
10	13	23.1
15	14	19.7
20	16	17.0
25	17	14.8
30	19	14.8
35	21	11.9
40	23	10.8
45	26	9.8
50	28	9.0
55	31	8.3
60	35	7.7
65	38	7.2
70	43	6.8

https://www.researchgate.net/publication/264420571_Performance_of_Reverse_Osmosis_Units_at_High_Temperatures



<https://www.sciencedirect.com/science/article/pii/S0011916403800413?via%3Dihub>



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Thank you!