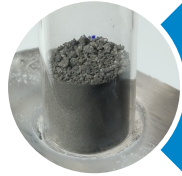


An Overview of SRU Research at Imperial College London

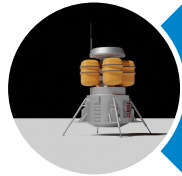
Presented By: Dr Joshua Rasera – j.rasera@imperial.ac.uk

Co-Authors: R.D. Cruise, Y. Yu, L. Malone, K. Ikeya, V. Schein, L.E. Salinas-Farran, S.O. Starr, K. Hadler, J.J. Cilliers

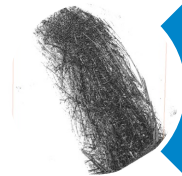
Research Overview



Beneficiation



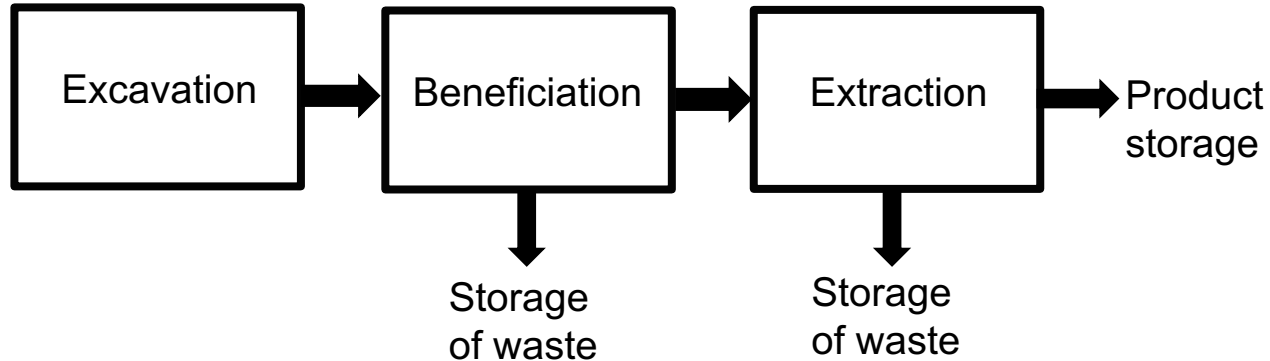
Plant Design &
Optimisation



Dust Handling &
Mitigation

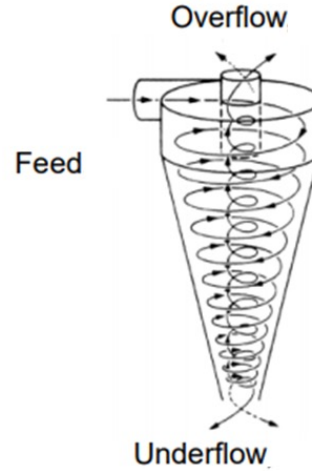
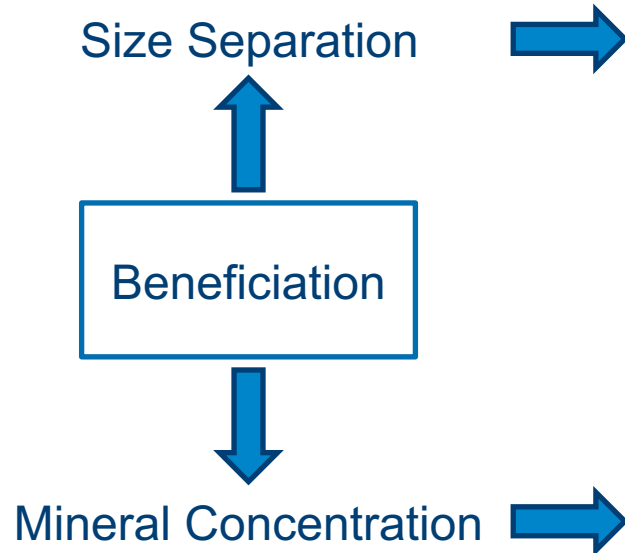
SRU Flowsheet

All SRU processes from lunar regolith follow the same basic flowsheet:



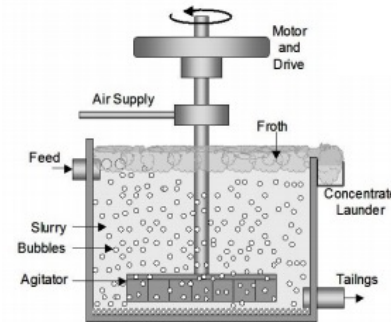
The feedstock required by the extraction defines the requirements of the whole process

What is Beneficiation?



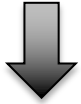
Extremely non-trivial
in dry conditions and
for fine (<1 mm)
particles

**Novel methods
required for Lunar
applications**



Why Beneficiate?

H₂ Reduction of
Ilmenite



- High grade ilmenite required
- Sizing for consistent reaction

Carbothermal
Reduction



- Silicates react at different temps.
- Sizing for consistent reaction

Molten Regolith
Electrolysis



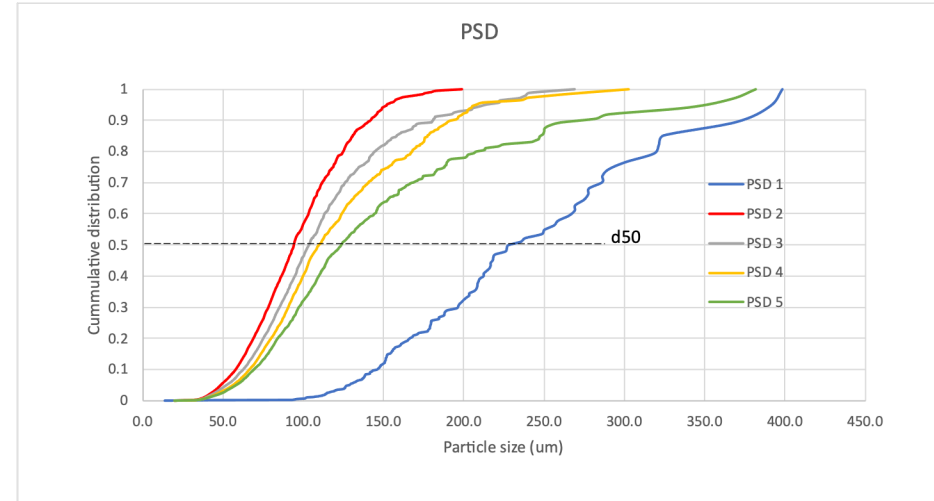
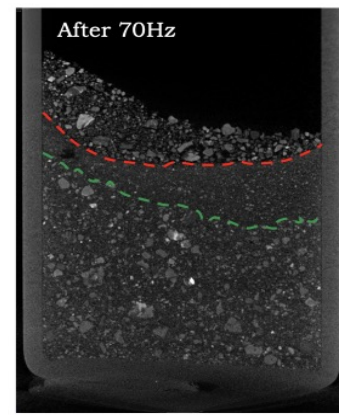
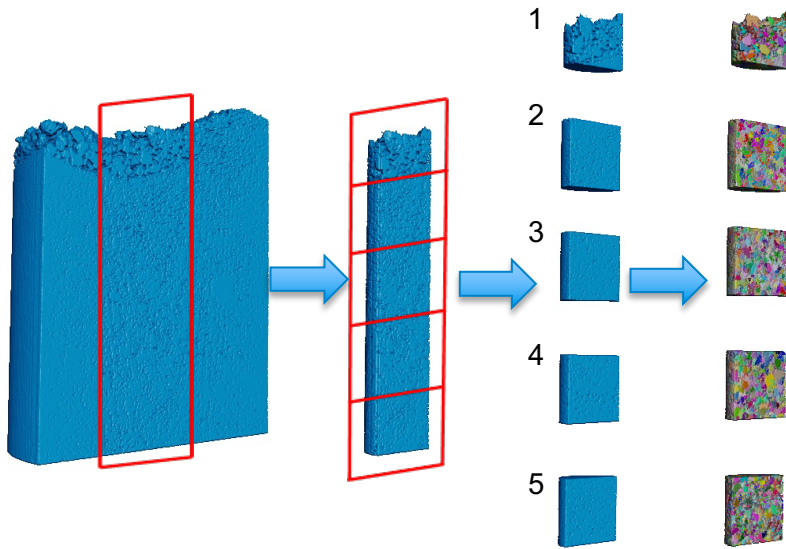
- Metal production
- Composition of feed affects physiochemical/thermophysical properties

FFC Cambridge

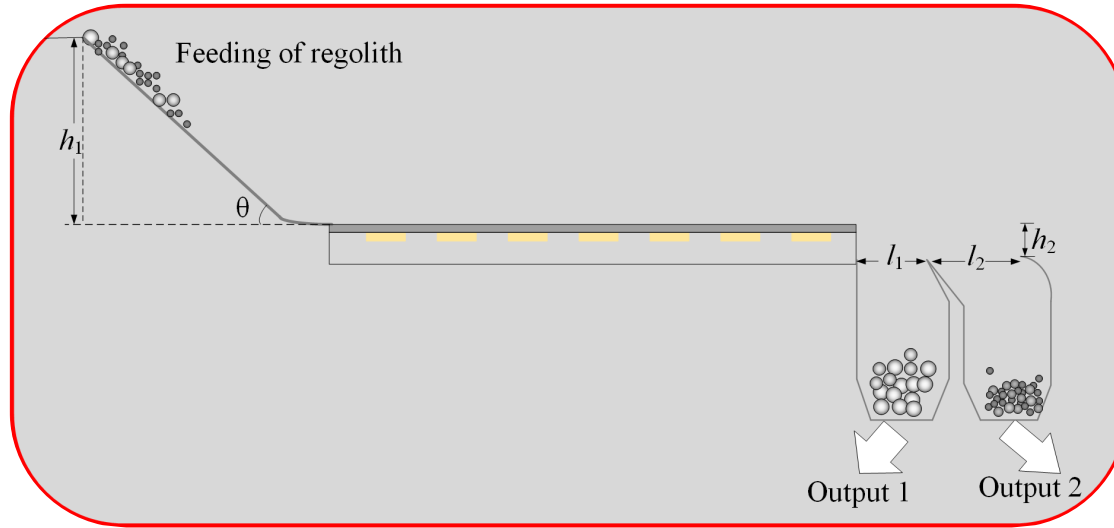


- Metal production
- Sizing to remove fines (electrolyte fouling)

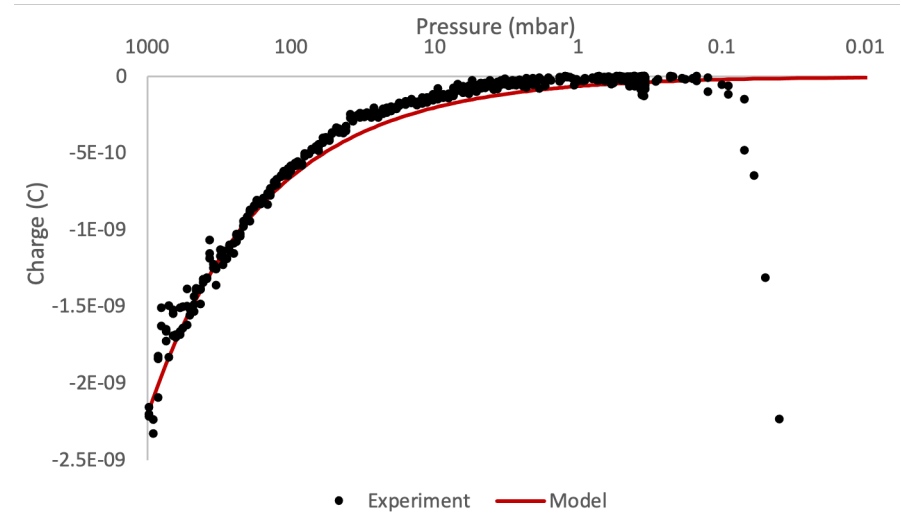
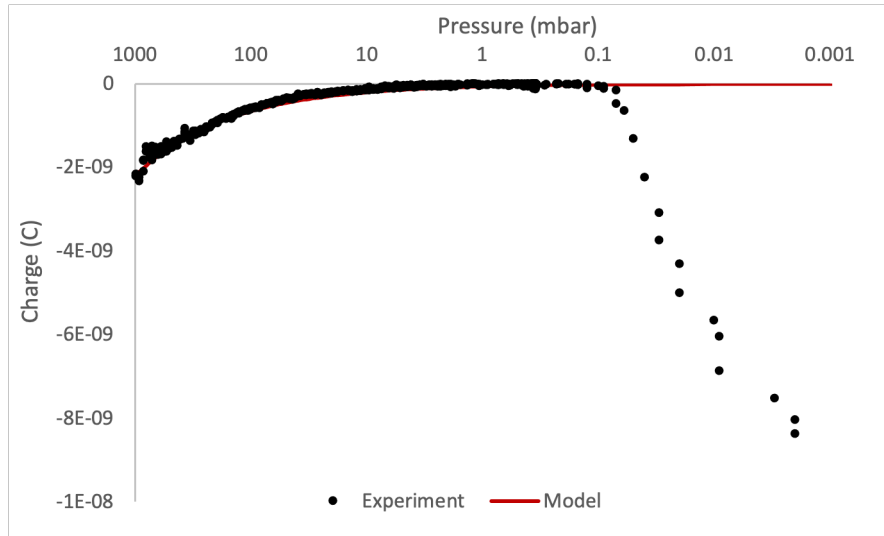
Vibrational Segregation (15601)



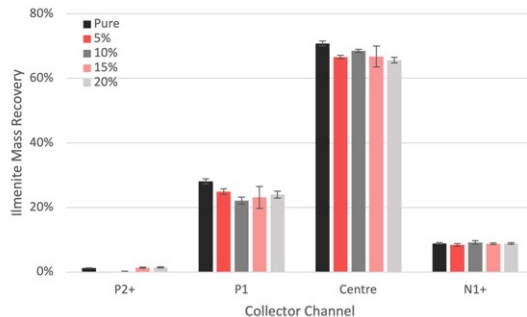
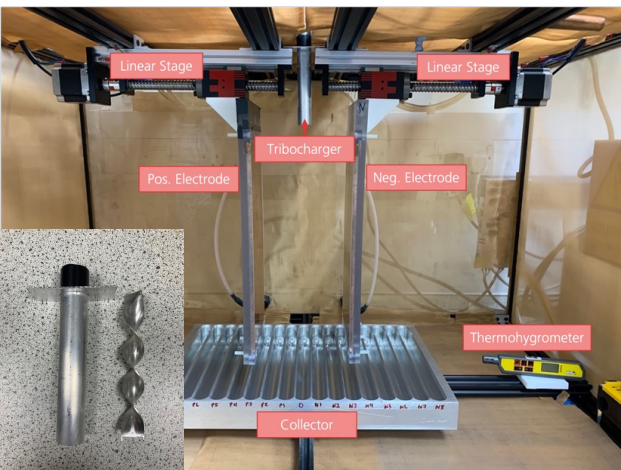
Classification by ETW



Triboelectric Theory

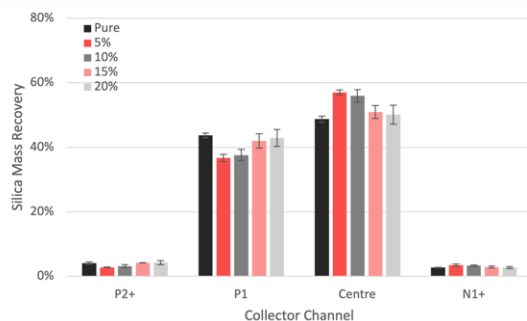
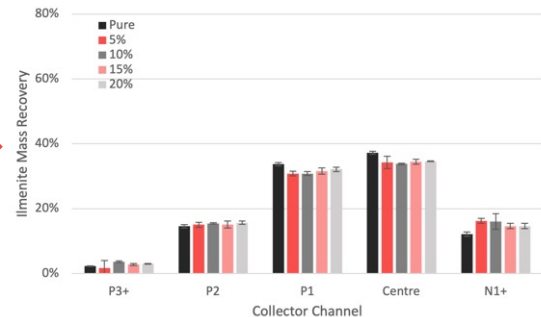


Tribocharger Design



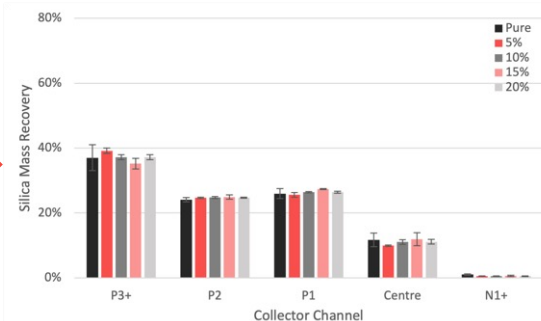
Ilmenite

Charger

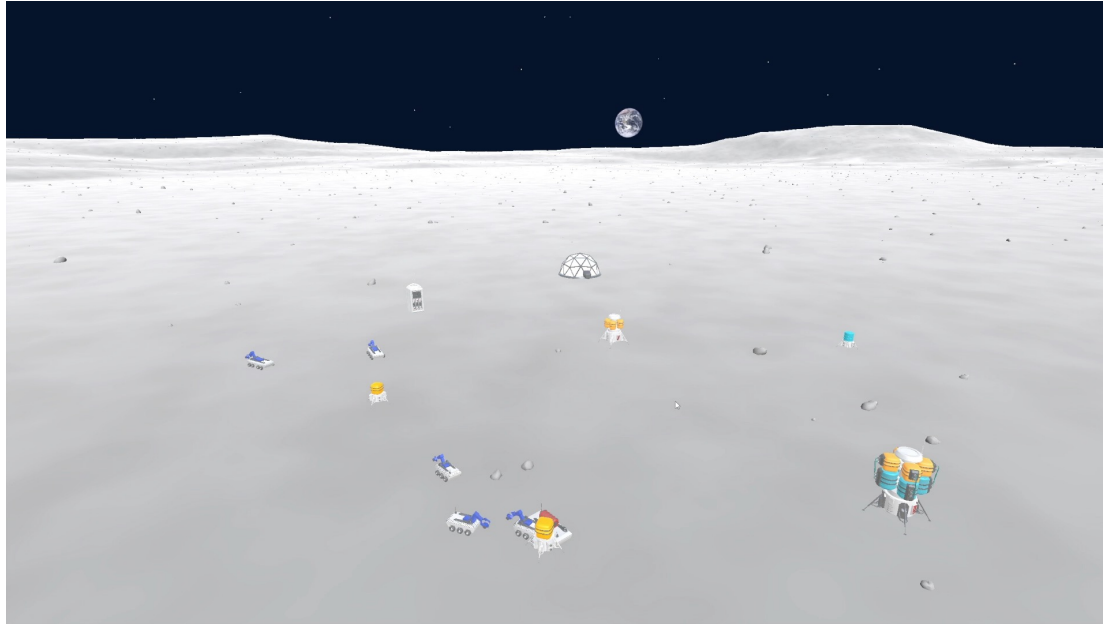


Silica

Charger



Plant Operation Simulation



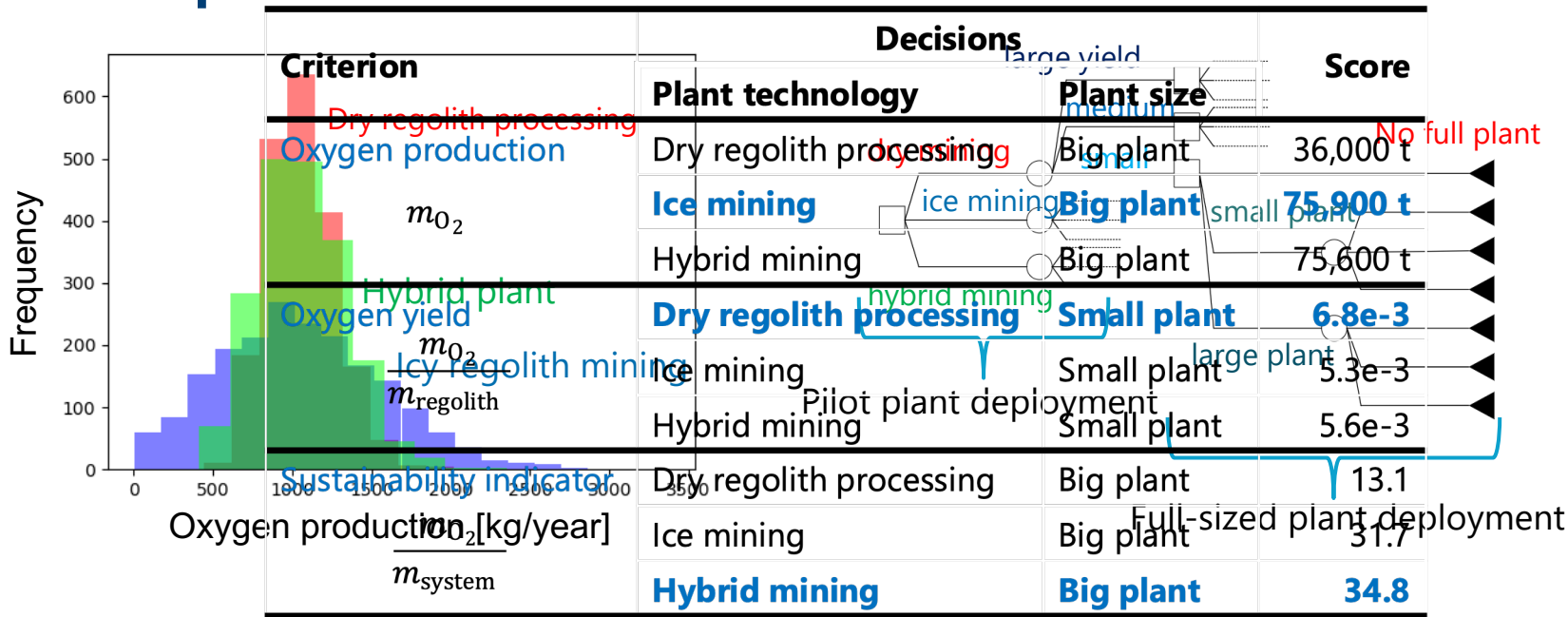
Plant Optimisation

1st decision: O₂ extraction technology

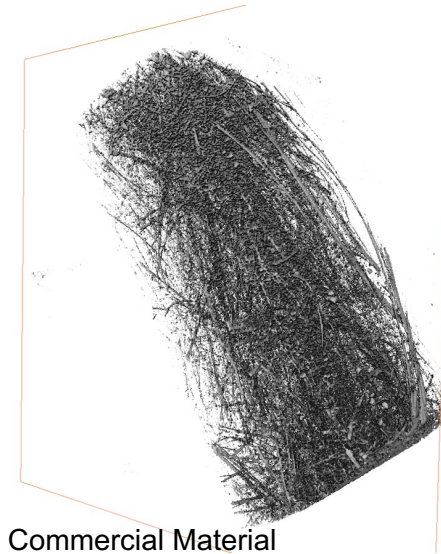
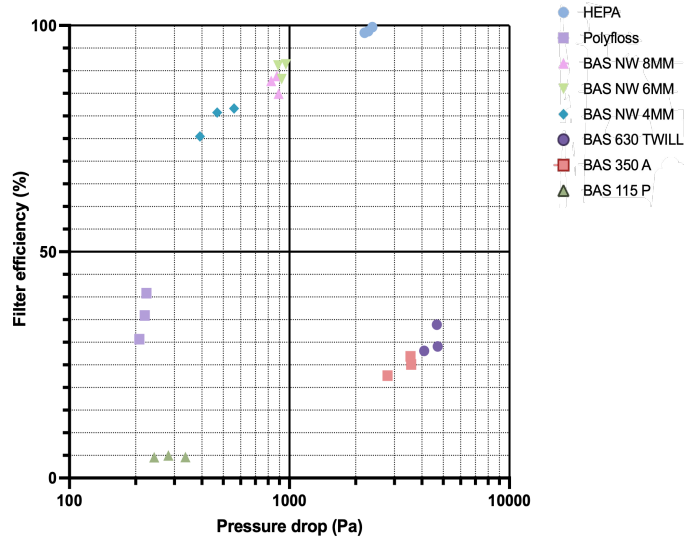
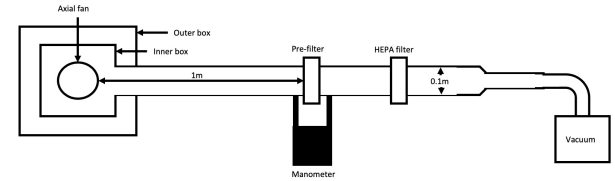
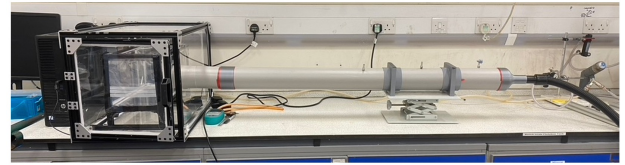
1st chance: O₂ yield of pilot plant (1 yr. operation)

2nd decision: Scale of full-sized plant

2nd chance: O₂ yield of full-sized plant (3 yrs. operation)



Dust Mitigation – Basalt Pre-Filters



Commercial Material



MoonFibre

Imperial College
London

Thank you!

J.N. Rasera, R.D. Cruise, Y. Yu, L. Malone, K. Ikeya, V.
Schein, L.E. Salinas-Farran, S.O. Starr, K. Hadler, J.J. Cilliers

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Imperial College
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Research Fund

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