

Oxford nanoSystems

nanoFLUX: Potential Applications for Microporous Coatings

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A bit about me



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- MChem w/Nanotechnology



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- OnS for 2 years



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- OnS for 2 years
- Reduce cost of process >90%



A bit about me

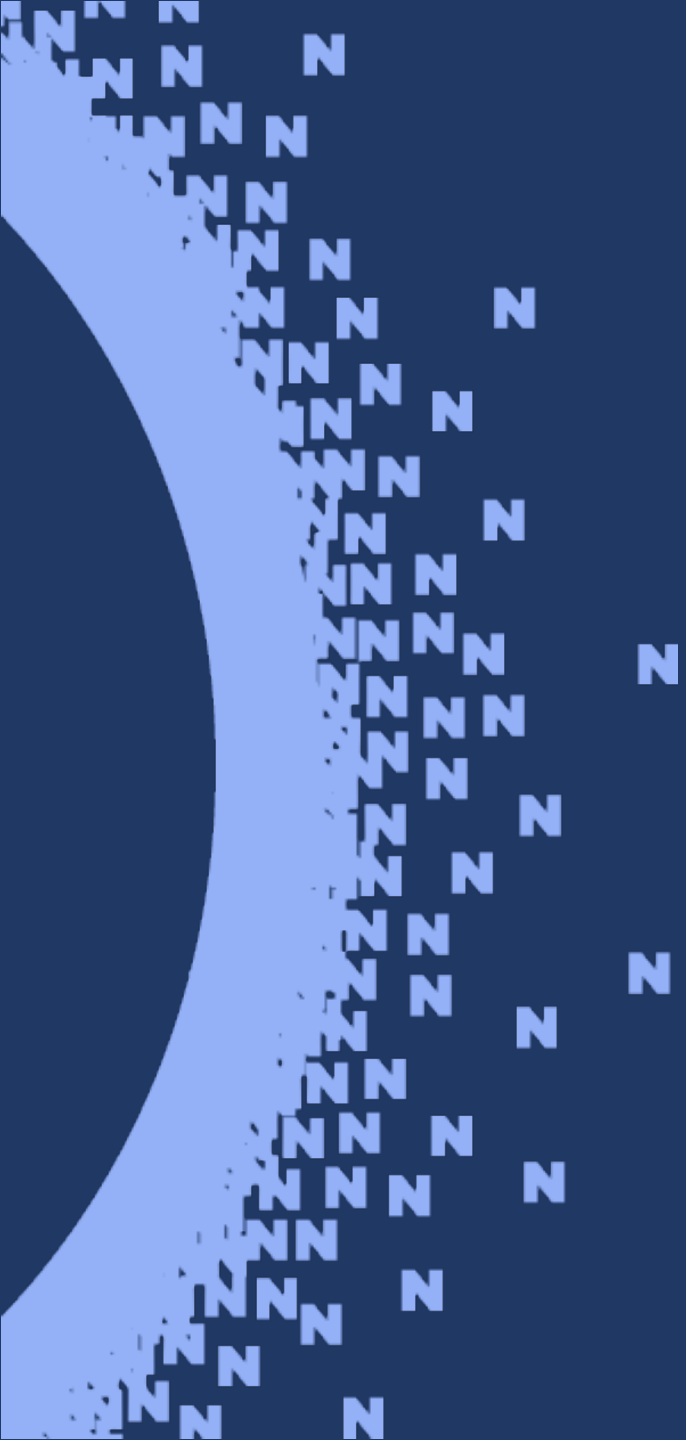
- MChem w/Nanotechnology
- OnS for 2 years
- Reduce cost of process >90%
- Increase HT coefficient >200%



A bit about me

- MChem w/Nanotechnology
- OnS for 2 years
- Reduce cost of process >90%
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- RoyalCom1851 Industry Fellow w/UCL

A bit about Oxford nanoSystems





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- Founded in 2012



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- N** • Team of 4



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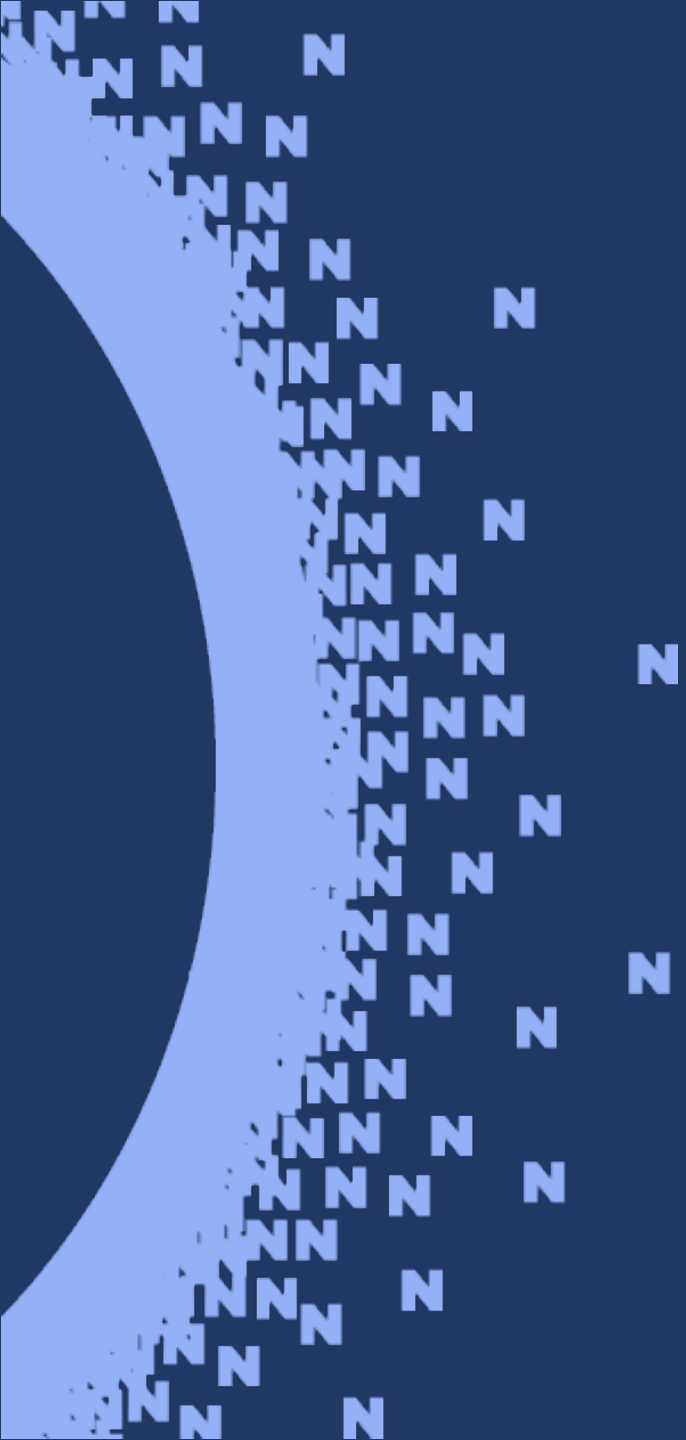
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- 3 years developing the technology



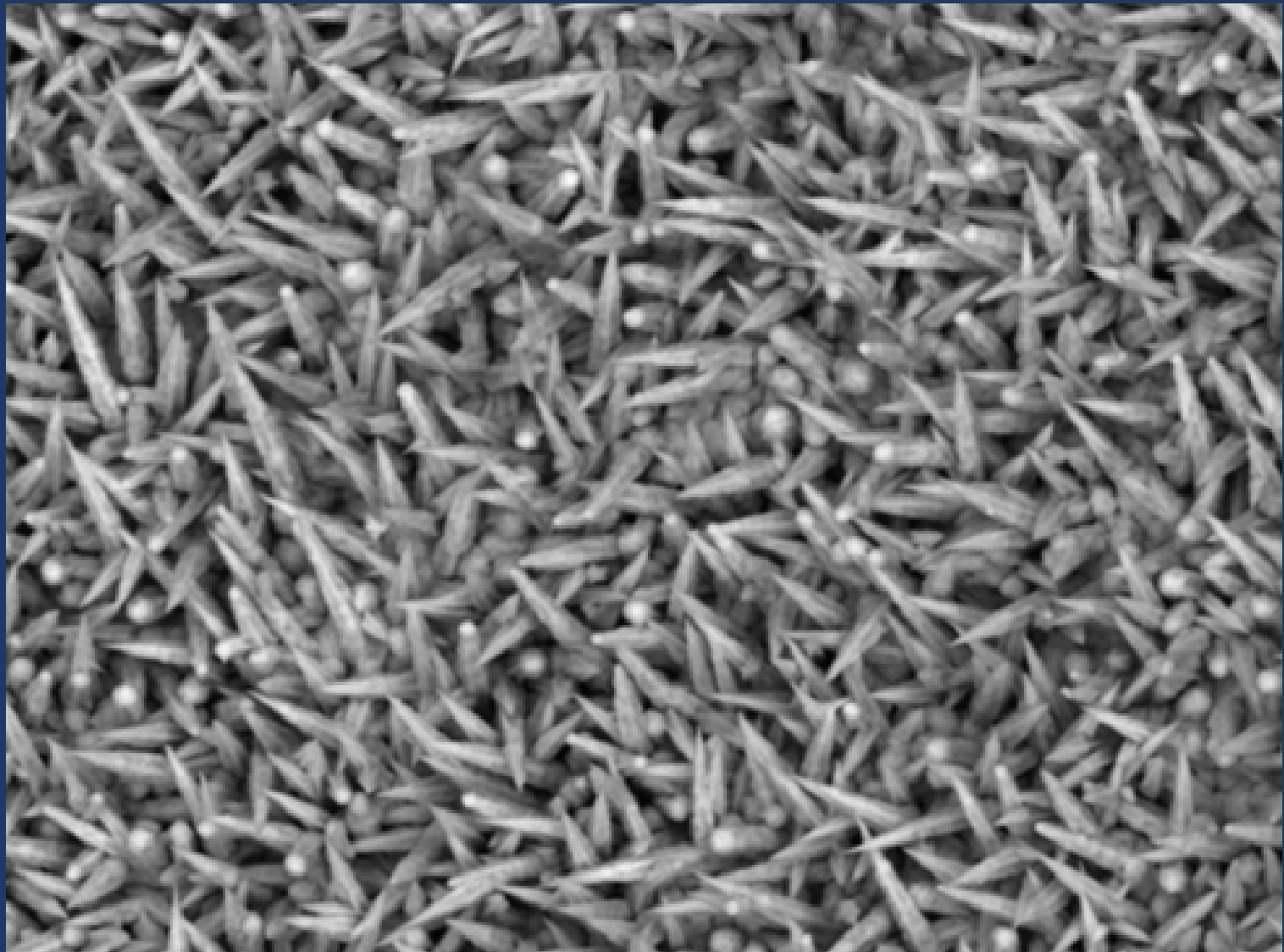
A bit about Oxford nanoSystems

- Founded in 2012
- Dr. Reip joined
- Team of 4
- 3 years developing the technology
- 2016 start development contracting

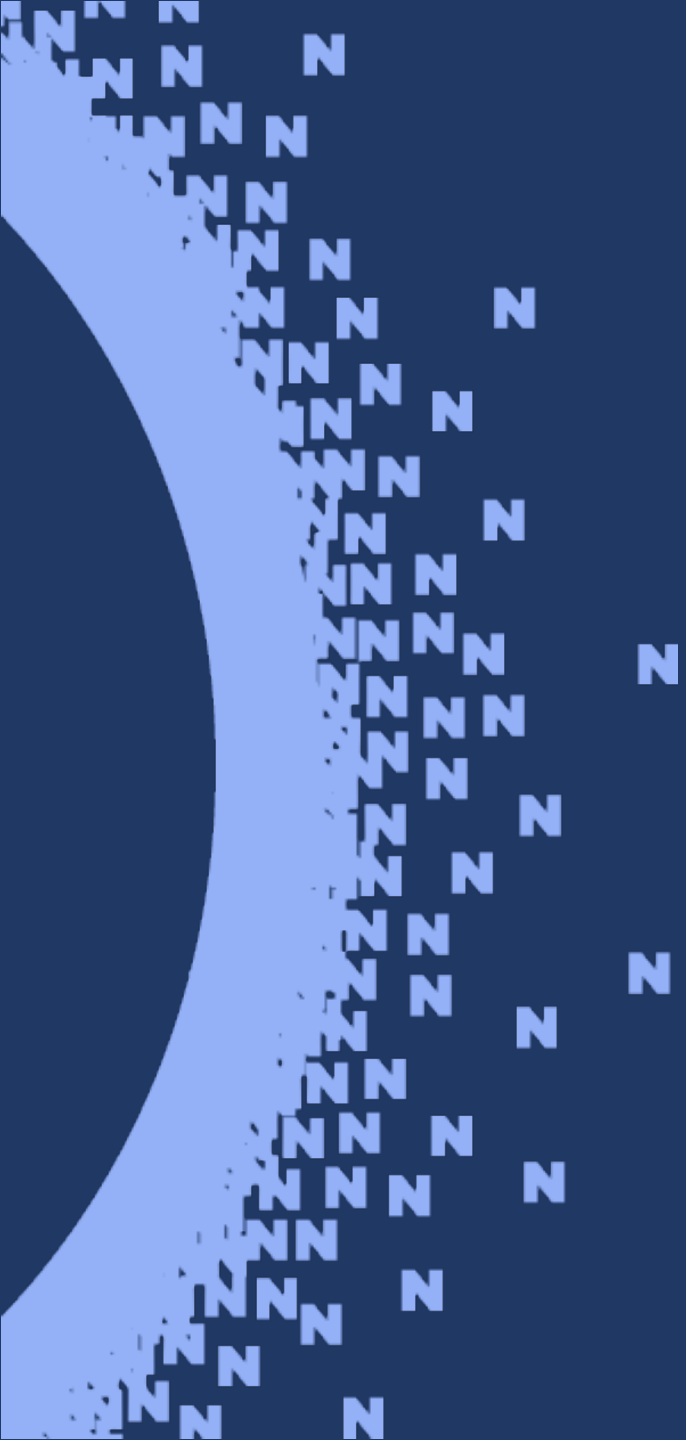
nanoFLUX: Heat transfer coating



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nanoFLUX: Application Process





nanoFLUX: Application Process

- Possible acid cleaning



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- DI rinse



nanoFLUX: Application Process

- Possible acid cleaning
- DI rinse
- Placed in solution/solution passed through



nanoFLUX: Application Process

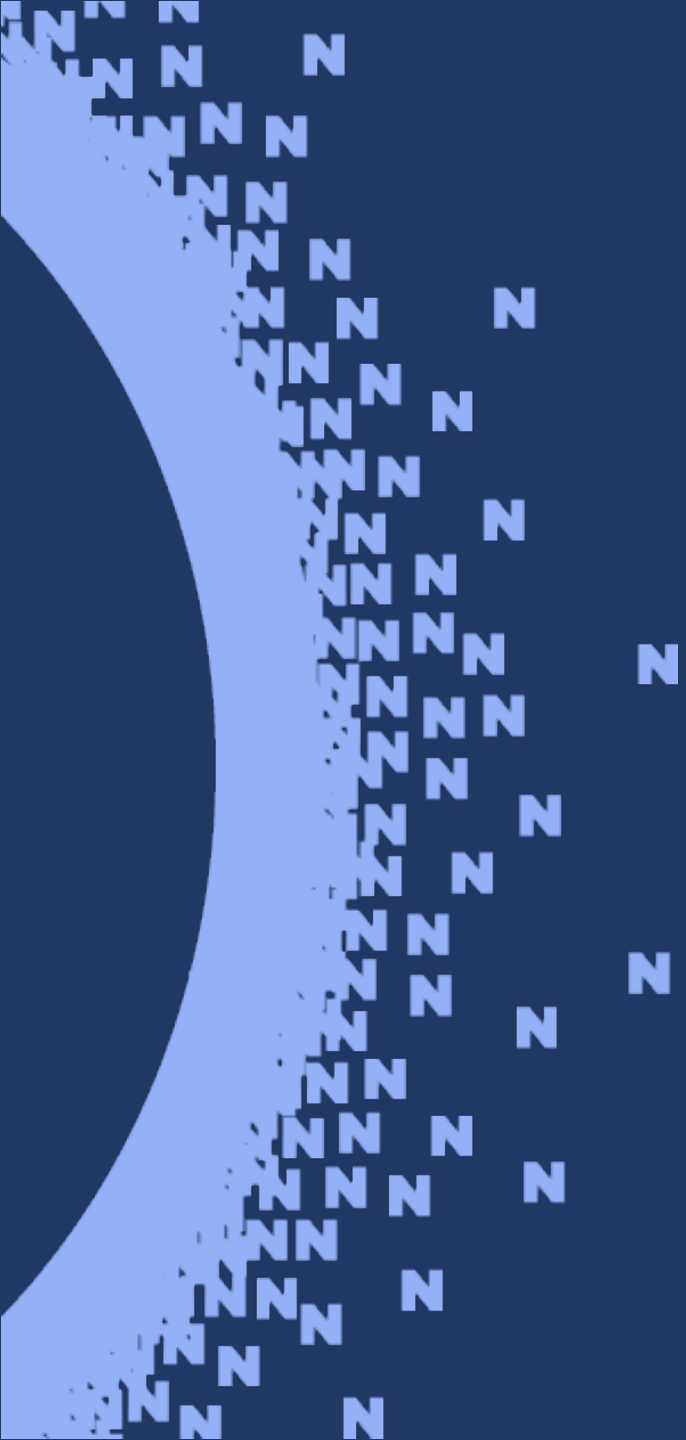
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nanoFLUX: Application Process

- Possible acid cleaning
- DI rinse
- N** • Placed in solution/solution passed through
- DI rinse
- nanoPROTECT applied

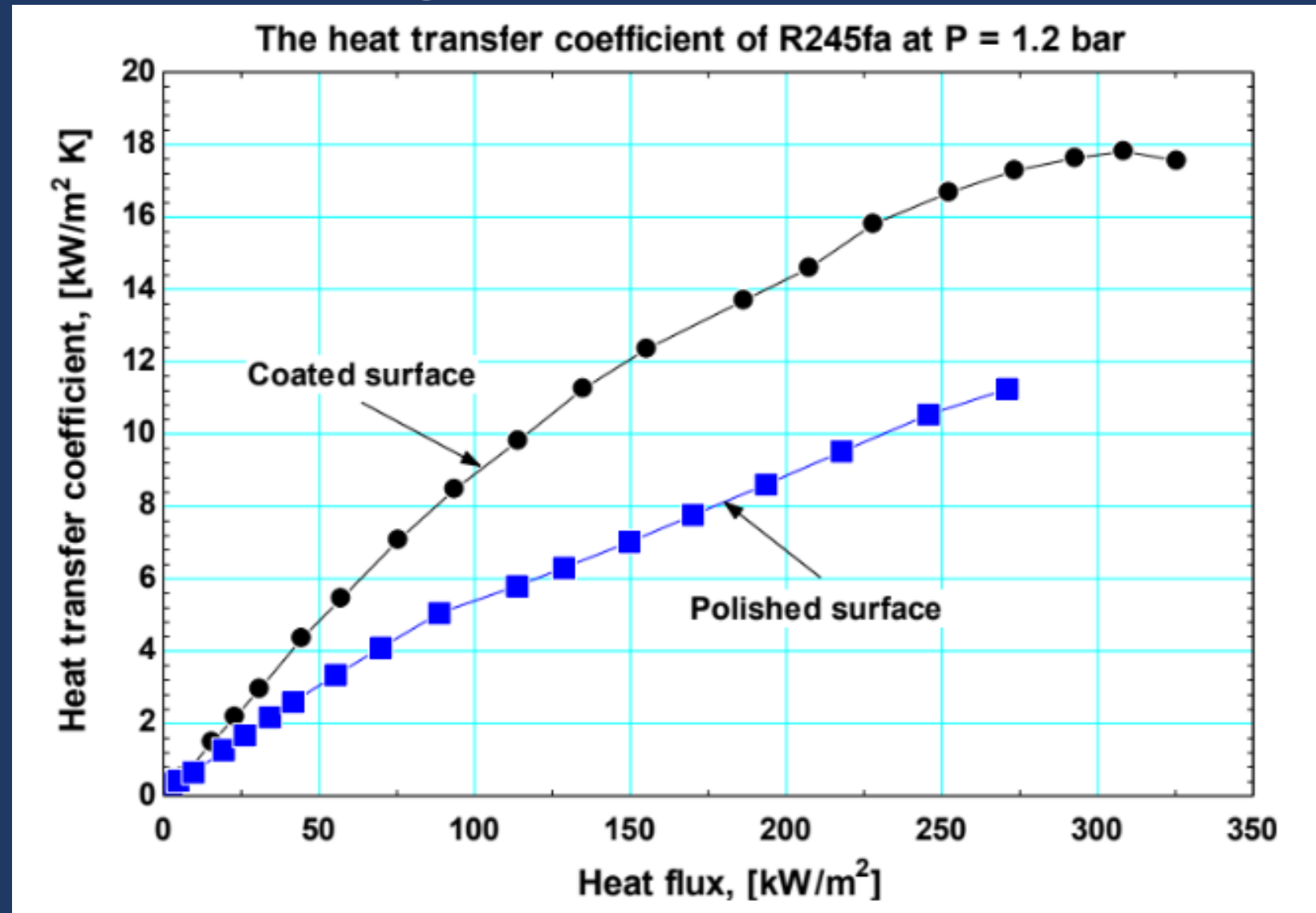
Pool Boiling



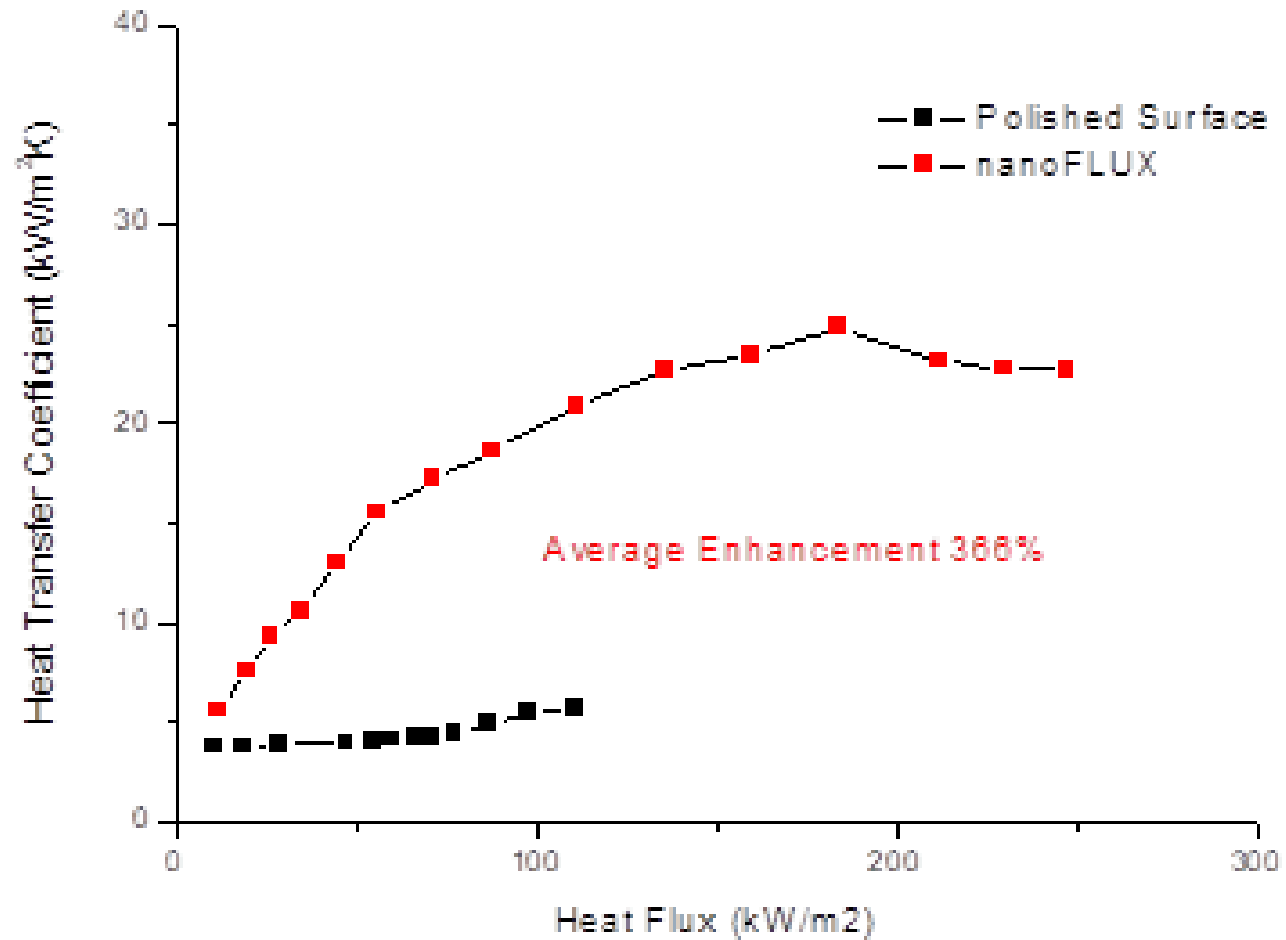
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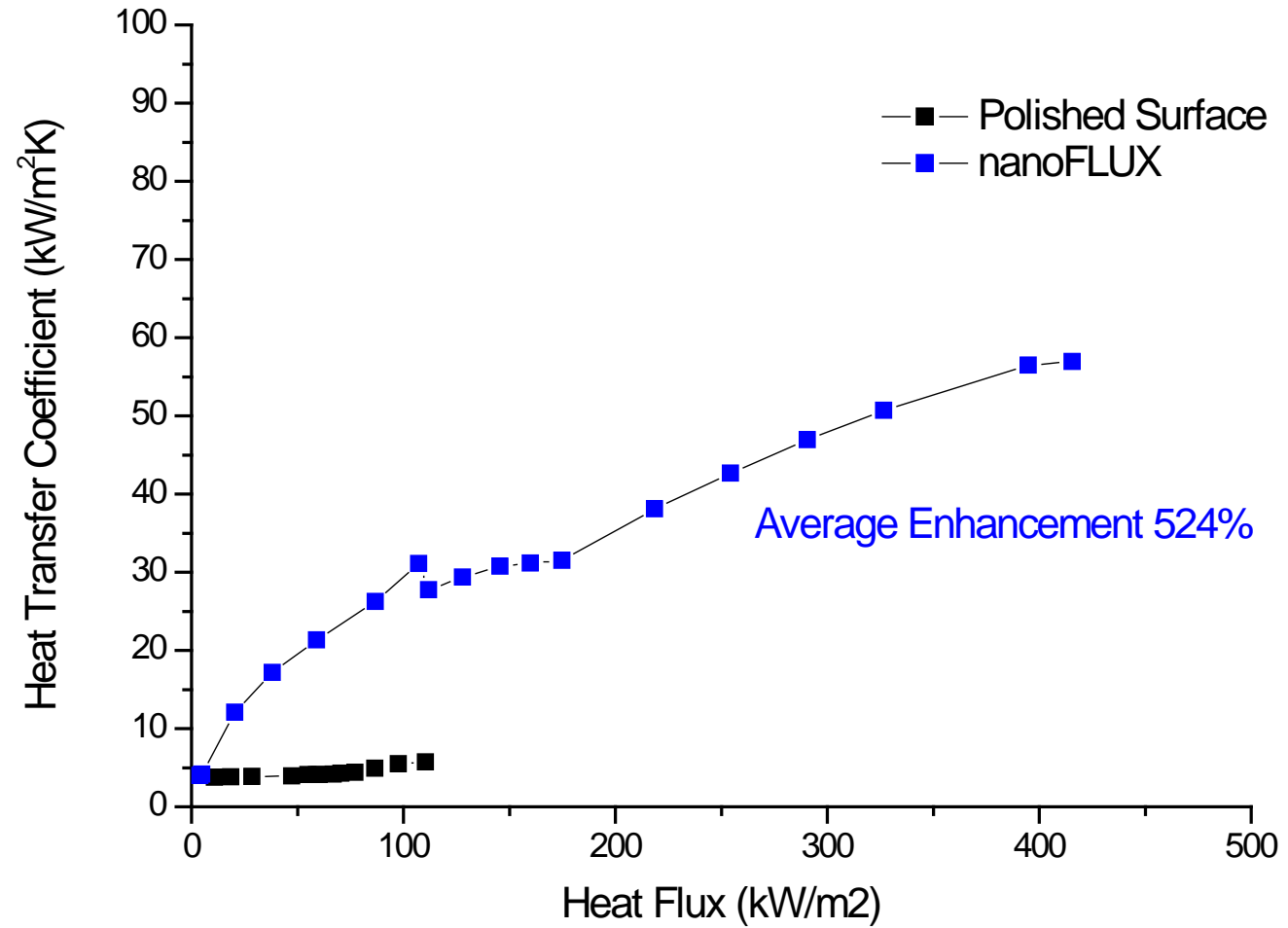
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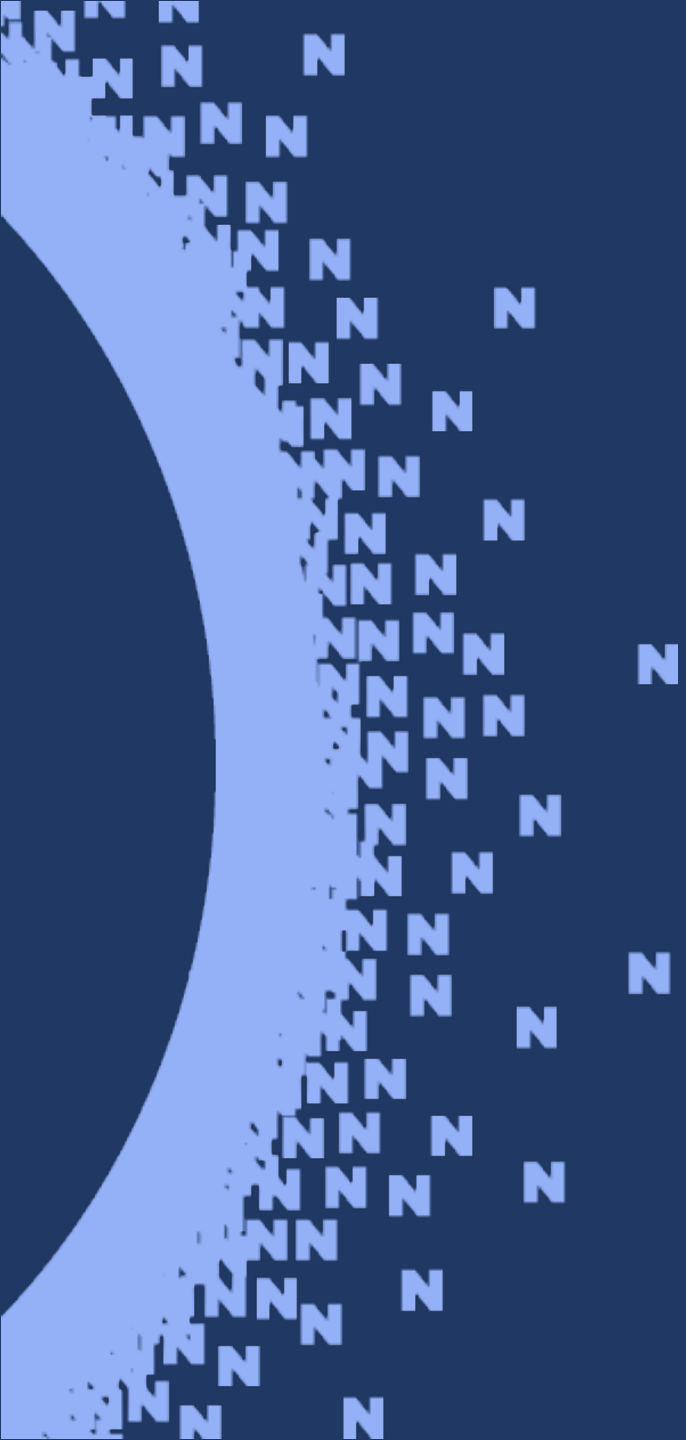
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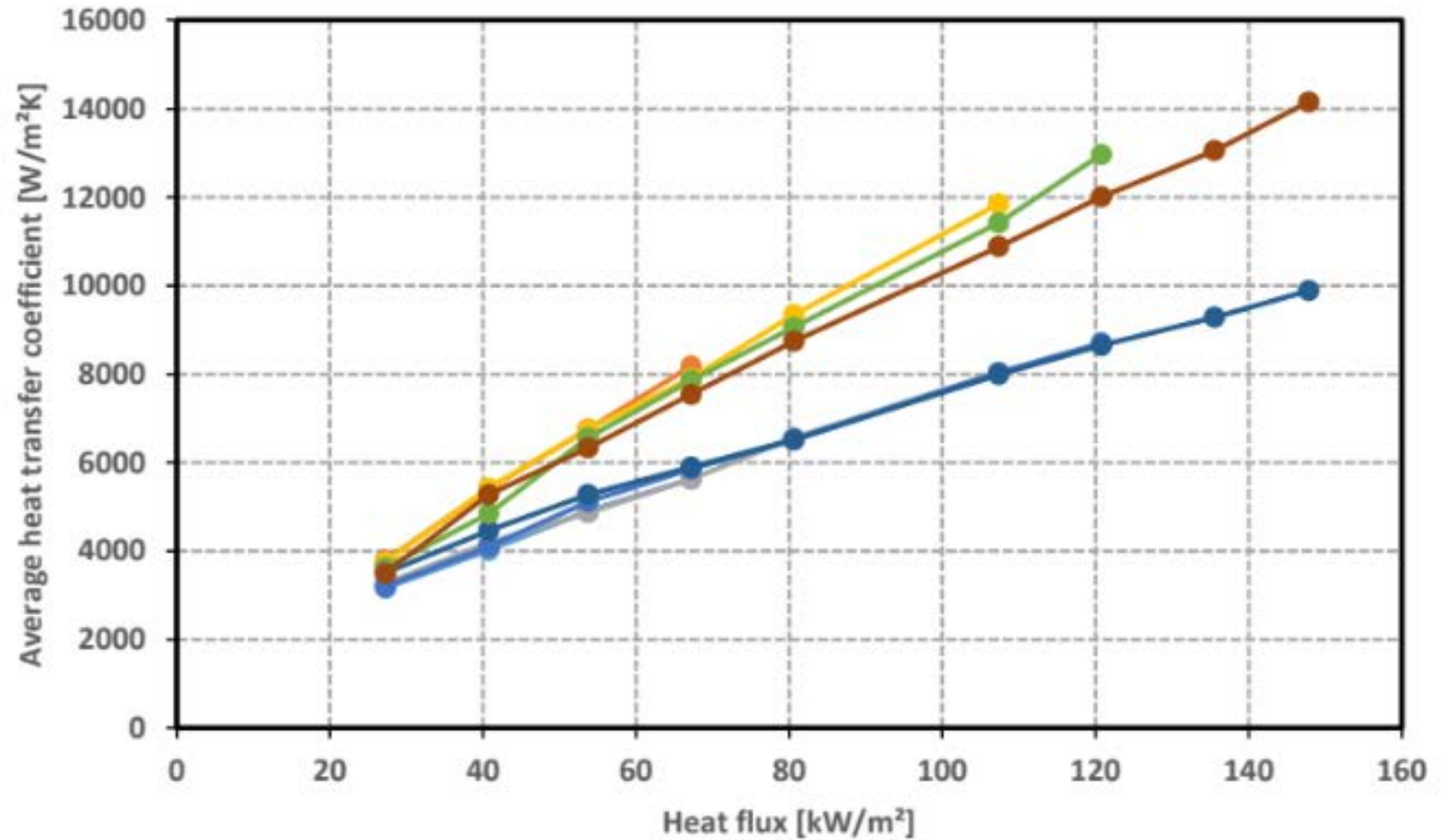
Pool Boiling



Flow Boiling

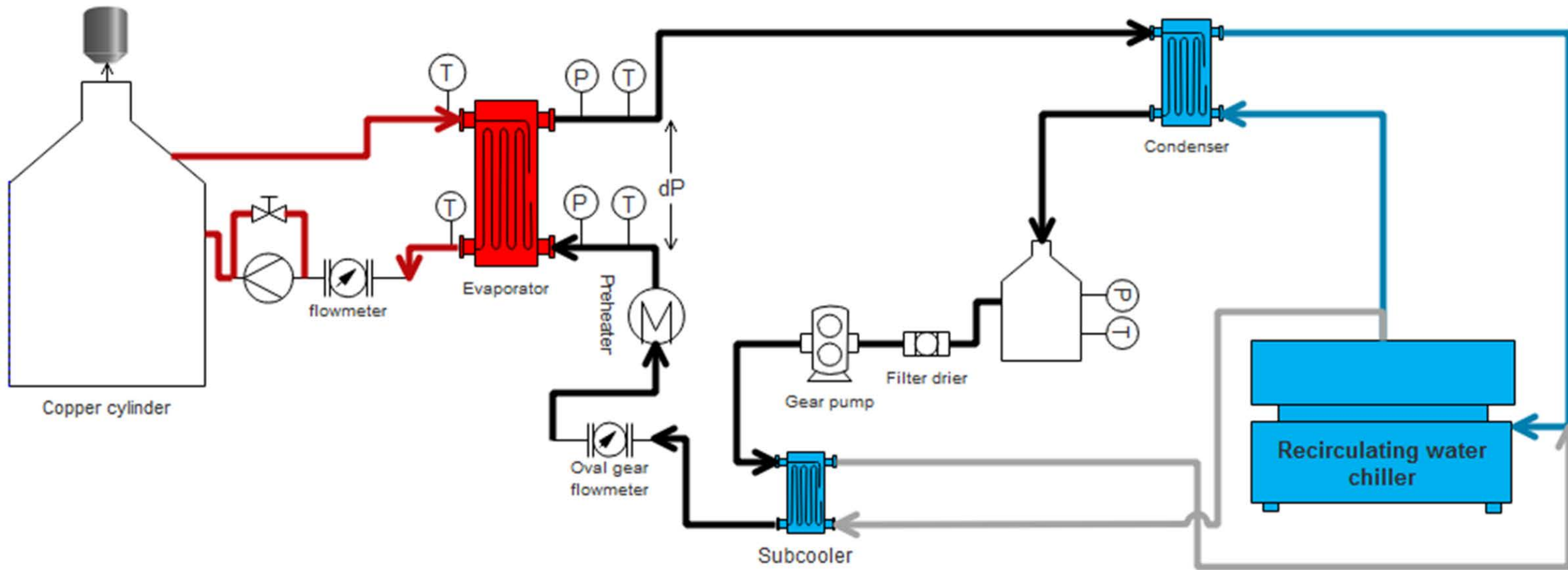


Flow Boiling

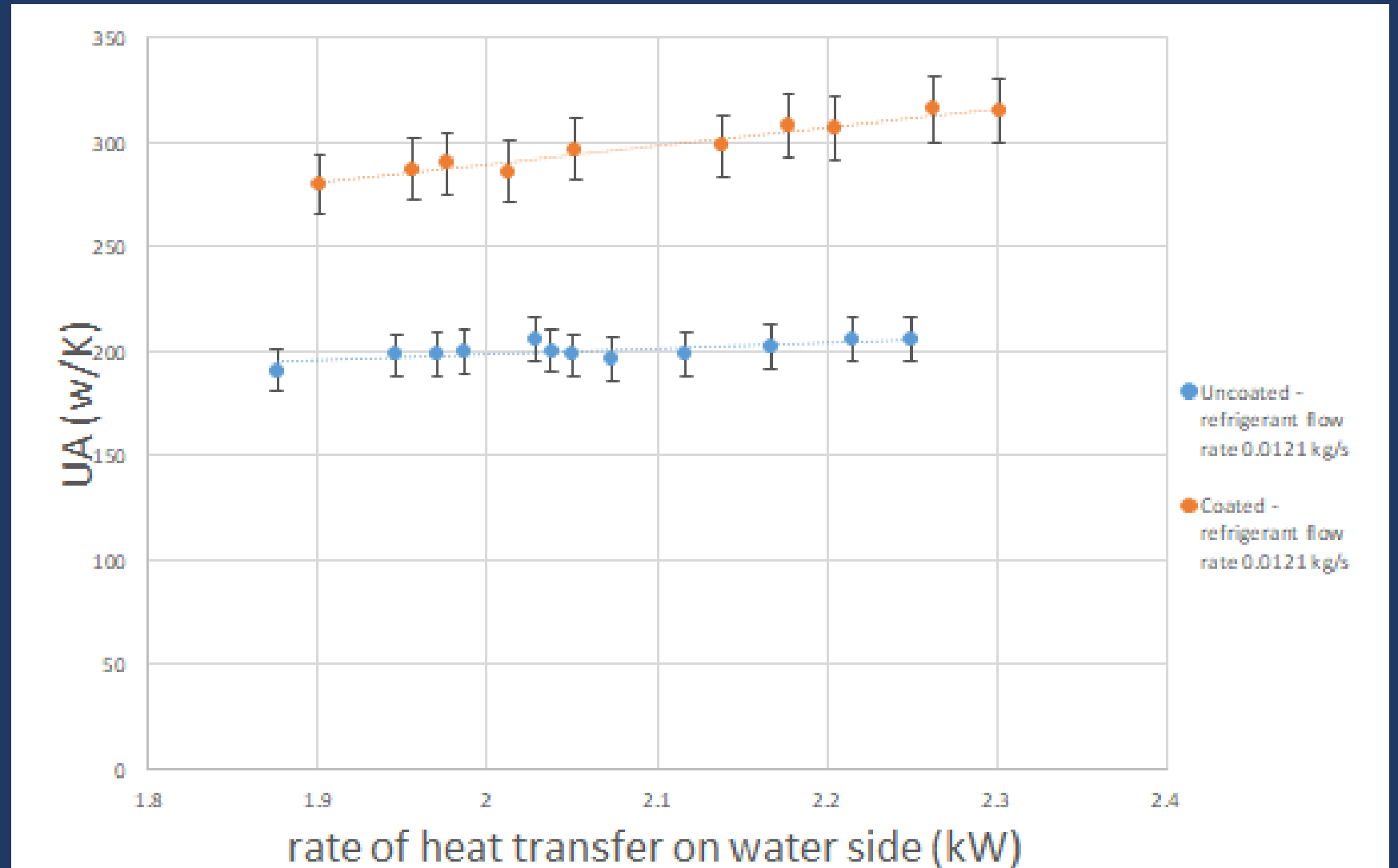


Tube without coating at G [kg/m²s] ● 200 ● 300 ● 400 ● 500
Tube with coating at G [kg/m²s] ● 200 ● 300 ● 400 ● 500

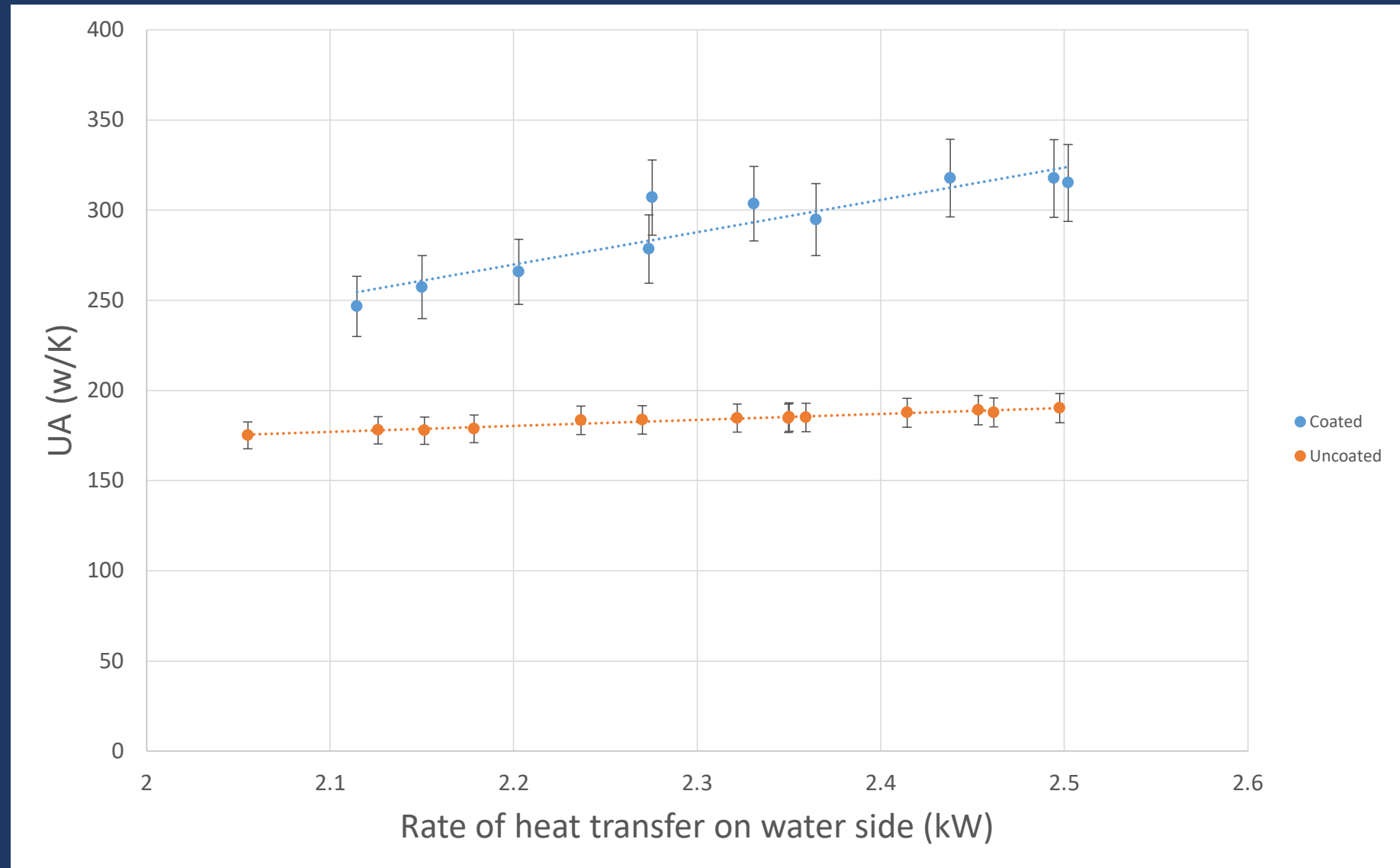
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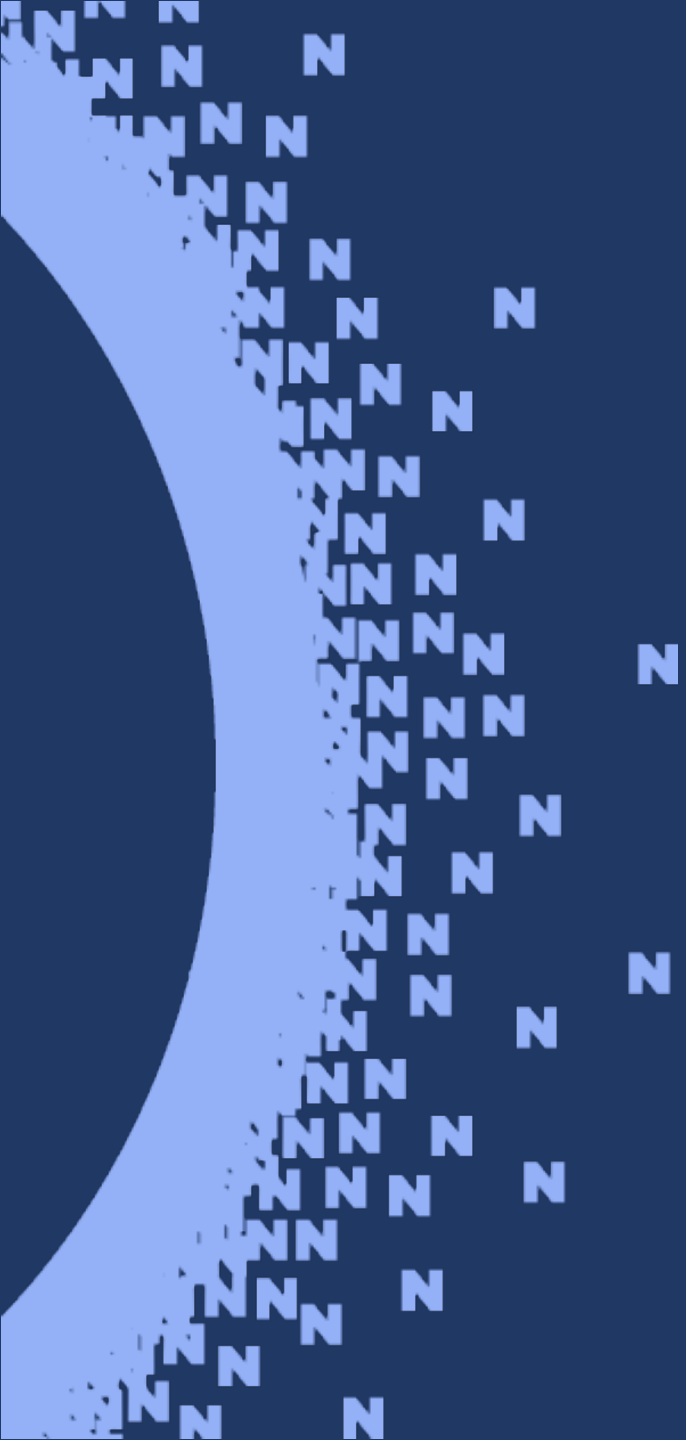
Flow Boiling



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Size Reduction





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- Commodity HEx manufactures



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- 100,000's of tonnes of materials



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- N** • Unstable metal pricing



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- Potential 70% cost reduction



Size Reduction

- Commodity HEx manufactures
- 100,000's of tonnes of materials
- N** • Unstable metal pricing
- Potential 70% cost reduction
- Increased throughput

A decorative graphic on the left side of the slide. It features a blue circle with a white border. From the bottom-left edge of the circle, a trail of white 'Z' characters extends towards the top-right, following the curve of the circle's edge. The 'Z' characters are of varying sizes and are arranged in a way that suggests motion or a path.

Energy saving



Energy saving

- Increased demand for AC globally

A decorative graphic on the left side of the slide. It features a dark blue, semi-circular shape representing the left edge of a globe. To the right of this shape, a series of white binary digits (0s and 1s) are arranged in a pattern that suggests a digital or data flow, extending from the top left towards the bottom right.

Energy saving

- Increased demand for AC globally
- 72% over next 15 years E.U.

A decorative graphic on the left side of the slide features a dark blue silhouette of a globe. To its right, a series of white binary digits (0s and 1s) are arranged in a curved, grid-like pattern that follows the curvature of the globe, creating a digital or data-themed background.

Energy saving

- Increased demand for AC globally
- 72% over next 15 years E.U.
- 3,300% globally by 2100



Energy saving

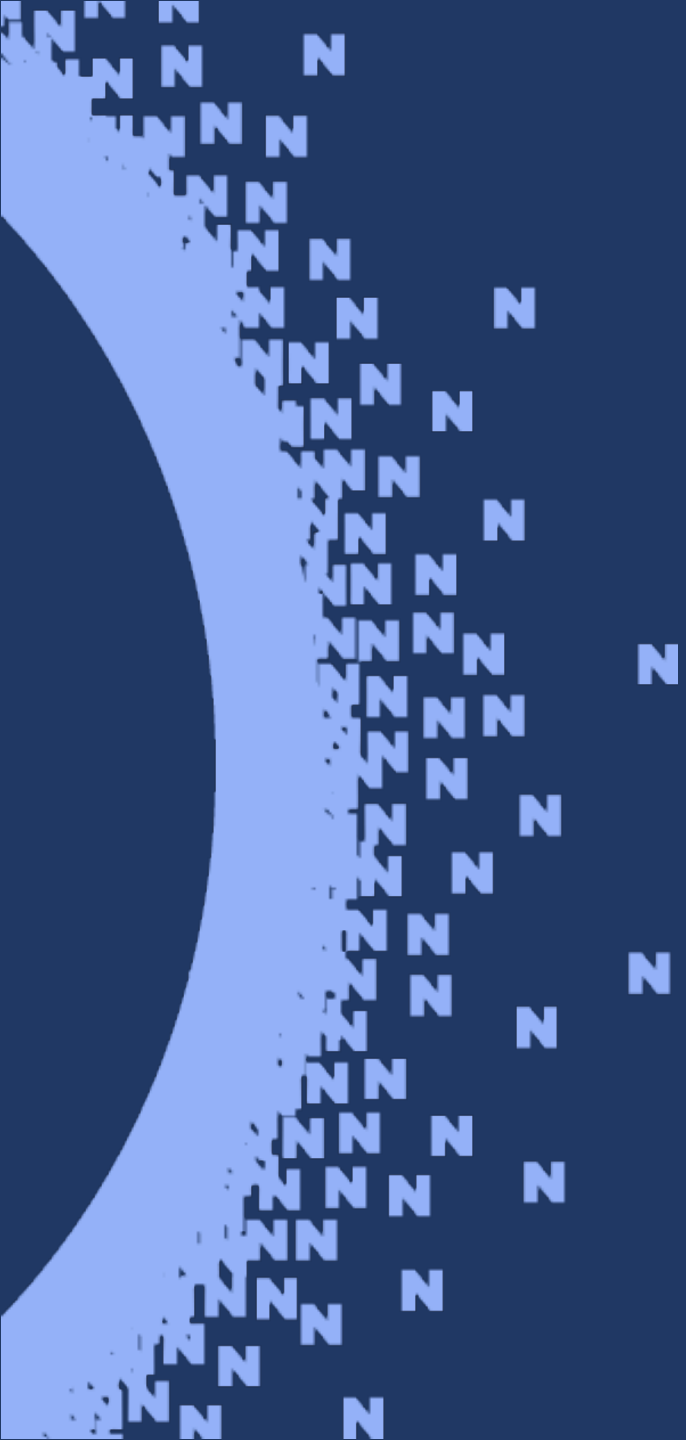
- Increased demand for AC globally
- 72% over next 15 years E.U.
- 3,300% globally by 2100
- Every +1K = -3% energy consumption

A decorative graphic on the left side of the slide. It features a dark blue, semi-circular shape resembling a globe or a stylized 'N'. To its right, a trail of white 'N' characters extends across the slide, following a curved path that suggests movement or a signal. The 'N' characters are of varying sizes and are arranged in a way that they appear to be receding into the distance.

Energy saving

- Increased demand for AC globally
- 72% over next 15 years E.U.
- 3,300% globally by 2100
- Every +1K = -3% energy consumption
- Less work at compressor

Power Generation





Power Generation

- UA determining factor for steam generator



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- LCOE reduction



Power Generation

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- N** • Ease of Waste Heat recovery



Power Generation

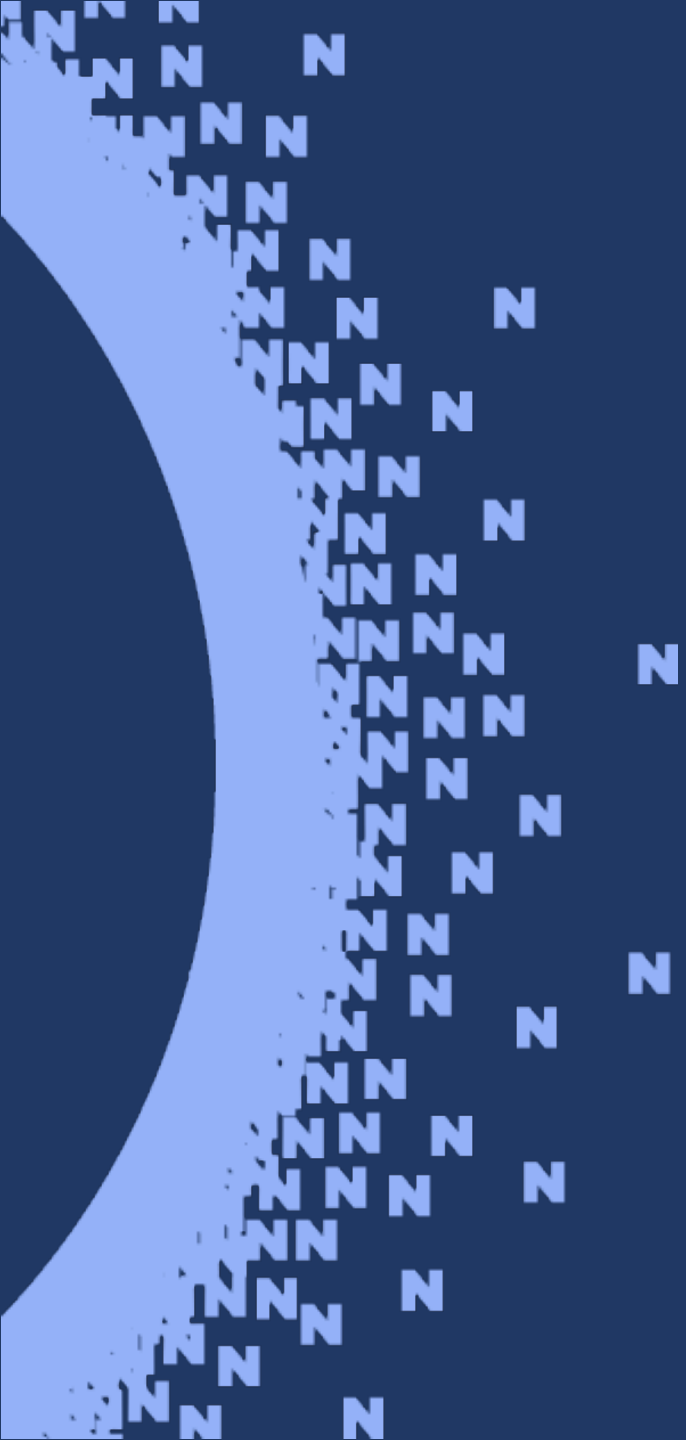
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- Increased CHP



Power Generation

- UA determining factor for steam generator
- LCOE reduction
- Ease of Waste Heat recovery
- Increased CHP
- More viable ORC sources

Thermal Stability





Thermal Stability

- Increasing demand from data centres



Thermal Stability

- Increasing demand from data centres
- High power electronics



Thermal Stability

- Increasing demand from data centres
- High power electronics
- N** • Process cooling



Thermal Stability

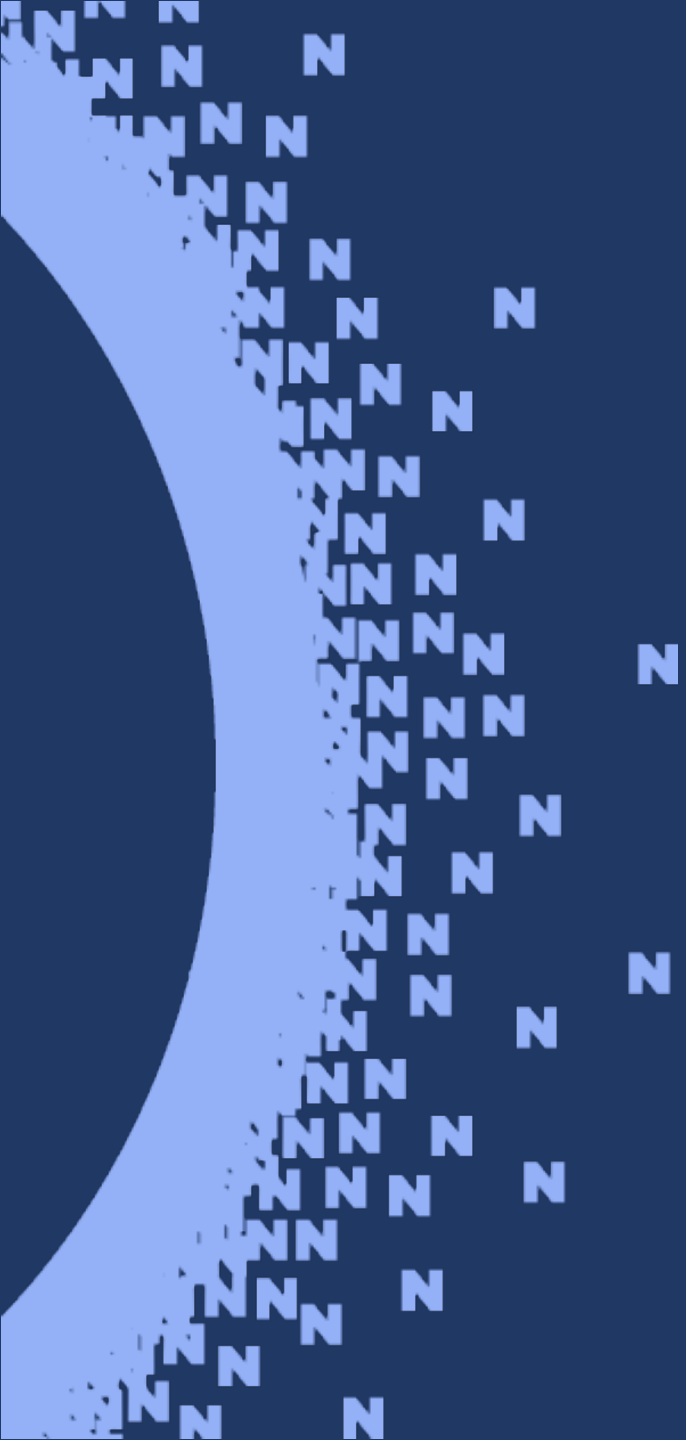
- Increasing demand from data centres
- High power electronics
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- Sensor array cooling



Thermal Stability

- Increasing demand from data centres
- High power electronics
- Process cooling
- Sensor array cooling
- Other applications

Current Challenges





Current Challenges

- Limited access to knowledge



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- Limited access to knowledge
- Translation of technology

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Current Challenges

- Limited access to knowledge
- Translation of technology
- Limited access to equipment

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Current Challenges

- Limited access to knowledge
- Translation of technology
- N** • Limited access to equipment
- Lack of knowledge at scale



Thank you for listening
Any Questions?