

機械科学・航空学科 齋藤 潔

Kiyoshi Saito, Dept. of Applied Mechanics and Aerospace Engineering,

論文, Published papers

- Niccolo Giannetti, Seiichi Yamaguchi, Kiyoshi Saito, Numerical simulation of Marangoni convection within absorptive aqueous Li-Br, International Journal of Refrigeration, Volume 92, 2018, Pages 176-184.
- Niccolo Giannetti, Seiichi Yamaguchi, Kiyoshi Saito, Simplified expressions of the transfer coefficients on a partially wet absorber tube, International Journal of Refrigeration, 2018, In Press, Corrected Proof, Available online 29 July 2018, ISSN 0140-7007.
- Niccolo Giannetti, Richard Jayson Varela, Hifni Ariyadi, Seiichi Yamaguchi, Kiyoshi Saito, Xin-Ming Wang, Hiroshi Nakayama, Semitheoretical Prediction of the Wetting Characteristics of Aqueous Ionic Liquid Solution on an Aluminum Finned-Tube Desiccant Contactor, Journal of Fluids Engineering, Volume 140, Issue 12, 2018, 121109-121109-10, FE-18-1162, doi: 10.1115/1.4040796.

学会発表, Presentations in conferences

- Niccolo Giannetti, Seiichi Yamaguchi, Kiyoshi Saito, Xin-Ming Wang, Hiroshi Nakayama, Theoretical prediction of the wetting characteristics of aqueous ionic liquid on a finned-tube desiccant contactor, JSRAE Annual Conference, 7 Sep 2018.
- 乾 はなこ, 山口 誠一, 齋藤 潔, 中山 浩, 王 新明, フィンチューブ型気液接触器における吸収溶液の濡れ面積割合の把握, JSRAE Annual Conference, 7 Sep 2018
- Piyatida Trinuruk, Niccolo Giannetti, Seiichi Yamaguchi, Kiyoshi Saito, Influence of the Fluid Distribution Width on the Wettability of Rivulet Flow over Vertical Flat Surfaces, 17th International Refrigeration and Air Conditioning Conference at Purdue, 11 Jul 2018.
- Niccolo Giannetti, Piyatida Trinuruk, Seiichi Yamaguchi, Kiyoshi Saito, Film Rupture and Partial Wetting over Flat Surfaces, 17th International Refrigeration and Air Conditioning Conference at Purdue, 11 Jul 2018.
- Hifni Ariyadi, Niccolo Giannetti, Seiichi Yamaguchi, Kiyoshi Saito, Modelling of water vapor absorption by aqueous ionic liquid fluids in a vertical-tube falling film absorber, Grand Renewable Energy 2018, 20 Jun 2018.

研究成果

ヒートポンプの性能を決定する非常に重要な現象である気液二相流現象について、2018 年度は乾き度と気液速度比の関係を定量的に明らかにすることを目的に、水-空気系での基礎的な

実験を行いその現象解明に向けた課題の洗い出し等を行った。特に脈動を伴う気液二相流について、その脈動の周波数と流動様式や圧力損失の関係などを、実験的に広範囲にわたって調べ、その基本的関係性について明らかにすることができた。

また、開放型吸収式除湿システムを対象に、そのシステム設計に関わる最適化計算を行った。具体的には、従来不明確であった、予冷器と除湿器の大きさの割合について最適点があることを明らかにし、その最適点が設計条件によりどのように変わるかについて提示することができた。

これらの成果は、ヒートポンプシステムのさらなる高性能化に向けた大きな指針となることが期待できると言える。

Research achievements

In 2018, we focused on gas-liquid two phase flow phenomena especially on the relationship between pulsing frequency of two phase flow and flow pattern or pressure drop. As a result, we were able to reveal the basic relationship between them using water - air system.

Moreover, we tried to optimize the size balance of a pre-cooler and a liquid desiccant dehumidifier for liquid desiccant air-conditioning system. In conclusion, we found that there is an optimum point, and the optimum point varies according to design conditions.

From these achievements, we were able to extract very important guidelines for improving the performance of heat pumps.