סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ד׳ 02.06.21

(כ״ב בסיון, תשפ״א), בשעה 13:30 באמצעות הזום :

https://technion.zoom.us/j/96363903112

מרצה: יגאל עברון

מנחה: פרופ׳ גרשון גרוסמן

על הנושא:

Investigation of an Absorption Heat Transformer (AHT) for temperature boosting of low grade\waste heat

The seminar will be given in Hebrew

תקציר ההרצאה :

An Absorption Heat Transformer (AHT) is a heat pump which is powered by low-grade (low temperature) heat to produce higher temperature heat. If waste heat is available, an AHT can upgrade it to useful (higher temperature) heat. An AHT typically operates between two pressure levels. An absorbing liquid salt solution absorbs the refrigerant gasses at the high-pressure level - thus releasing heat and producing the desired high temperature. The weak (low salt concentration) solution is then regenerated at the low-pressure level using the available waste heat. The AHT comprises a system of pressure vessels, pumps, piping, valves, sensors, and heat exchangers, to maintain the continuous steady operation of this absorption/desorption cycle.

The goal of this work was to collaborate with European researchers and industries (as part of the Indus3Es project under the Horizon 2020 framework - www.indus3es.eu) to advance the state-of-the-art AHT technology. The project includes the design and testing of a 10 kW Lab-scale AHT, then increasing to a 50 kW scale, and finally installing and running a 200 kW AHT at a real industrial environment simulating a potential client.

This work focused on improving the high-pressure vessel design, mostly by maximizing the high temperature by obtaining adiabatic absorption using atomizing spray nozzles. An additional focus was on designing a motor-less purge-system to remove non-absorbable gasses which are virtually unavoidable and must be continuously or periodically removed from any absorption heat pump. The resulting design was tested, verified, and patented.

A potential for an increase in efficiency was identified for certain situations where the waste heat and the useful heat temperature are similar (up to 10K difference). Several multi-stage configurations were simulated and the result demonstrate a significant (about 30%) increase in efficiency. Certain configuration also reduces the risk of salt crystallization which allows the system to maximize its available potential and avoid serious repair downtimes.

בברכה,

שפופ״ת אתי סאס

מרכז הסמינרים