A review on the PH.D. thesis entitled

"Absorption power cycle with aqueous salt solution for low temperature heat utilization"

by Ing. Václav Novotný

Achievement of the aims of the thesis:

After comparing the contents of the Chapter 5 "Goals of the thesis" with those of the Chapter 9 "Conclusions". It is confirmed that the proposed three thesis goals have been achieved. Actual applicability of salt APC appears as limited for waste heat recovery (large heat exchangers), although the proposed combined power and cooling system with cost effective turboexpander may help for the widespread of LiBr chillers.

Level of the analysis of state-of-the-art done on the issues dealt with in the dissertation**:**

Just typical thermodynamic cycle analyses (including sensitivity analyses) were performed by using, for instance, the Engineering Equation Solver (EES), REFPROP, etc.

Contribution of the Ph.D. thesis to the theory of subject elaborated:

A theoretical investigation has shown the largest benefits of salt APC in low temperature applications (below about 120°C), mainly for waste heat recovery. One of the beneficial features is a temperature glide during phase change. Impact of parasitic load is highlighted. A technically feasible combined power and cooling system was proposed, where salt solutions can bring a simplification against some water ammonia systems. Based on theoretical analysis it outperforms water-ammonia working fluid as well as benchmark system combining organic Rankine cycle (ORC) with vapour compression chiller.

Contribution of the Ph.D. thesis to engineering practice:

APC proof-of-concept unit with LiBr has been designed and built with hundred Watts nominal power output to validate technical feasibility. It includes specific design aspects as plastic turboexpander with 3D printed components and actual temperature glide measurement. Based on the literature review, it is the first salt solution APC ever reported. With the heat source temperature below 90°C, the maximum gross electrical cycle efficiency reached 0.8 % and about 150 W. With a state-of-the-art turbo-expander, the potential exists for cycle efficiencies of 5 % and heat source utilisation efficiencies 0.5 % at the explored operating conditions.

Relevance of the applied methods:

Yes, I do see the relevance between the applied methods.

Relevance and approach to the method application:

I do not see any inadequacies in relevance and approach to the method application.

Adequacy of student's knowledge in special field as demonstrated by the dissertation contents:

The thesis is well written based on student's knowledge in the absorption power cycle with aqueous salt solution for low temperature heat utilization.

Formal issues of the Ph.D. thesis:

Explicit statement whether you recommend or do not recommend the dissertation to the final defence presentation:

Based on the contributions of the Ph.D. thesis to the theory of subject elaborated as well as engineering practice, I recommend the dissertation to the final defence presentation.

Tong-Miin Liou