

Predicting improved cooling speed of metals coated with low conductive materials in liquid nitrogen !

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5 X faster cooldown !

Slides deleted: Manuscript is under consideration for a publication. Check Applied Thermal Sciences webpage for updates

1. Introduction

2. Experiments

3. Phenomenological model

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Predicting cooldown time for coated metals !

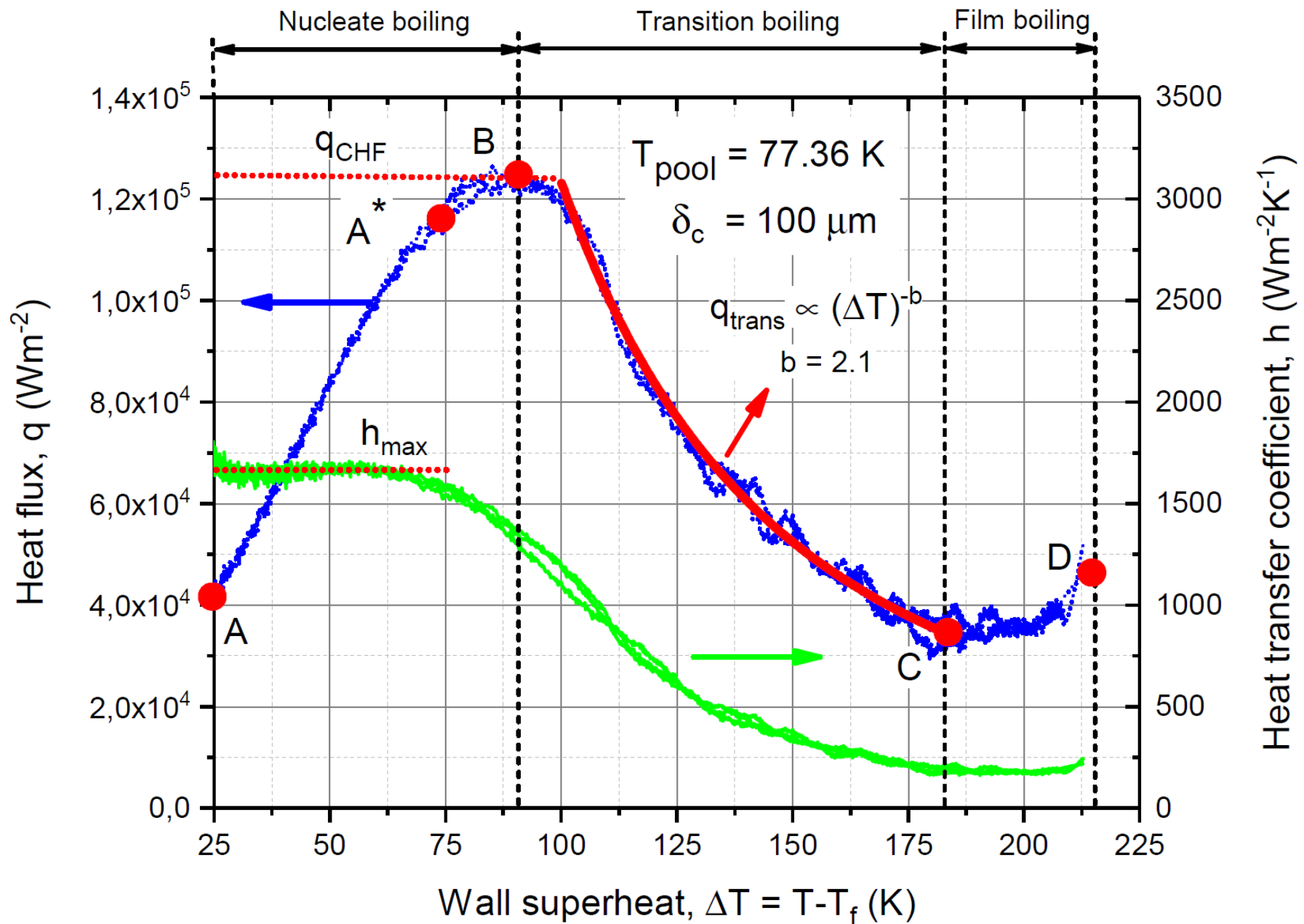
How about subcooled liquid nitrogen ?

Conclusions -

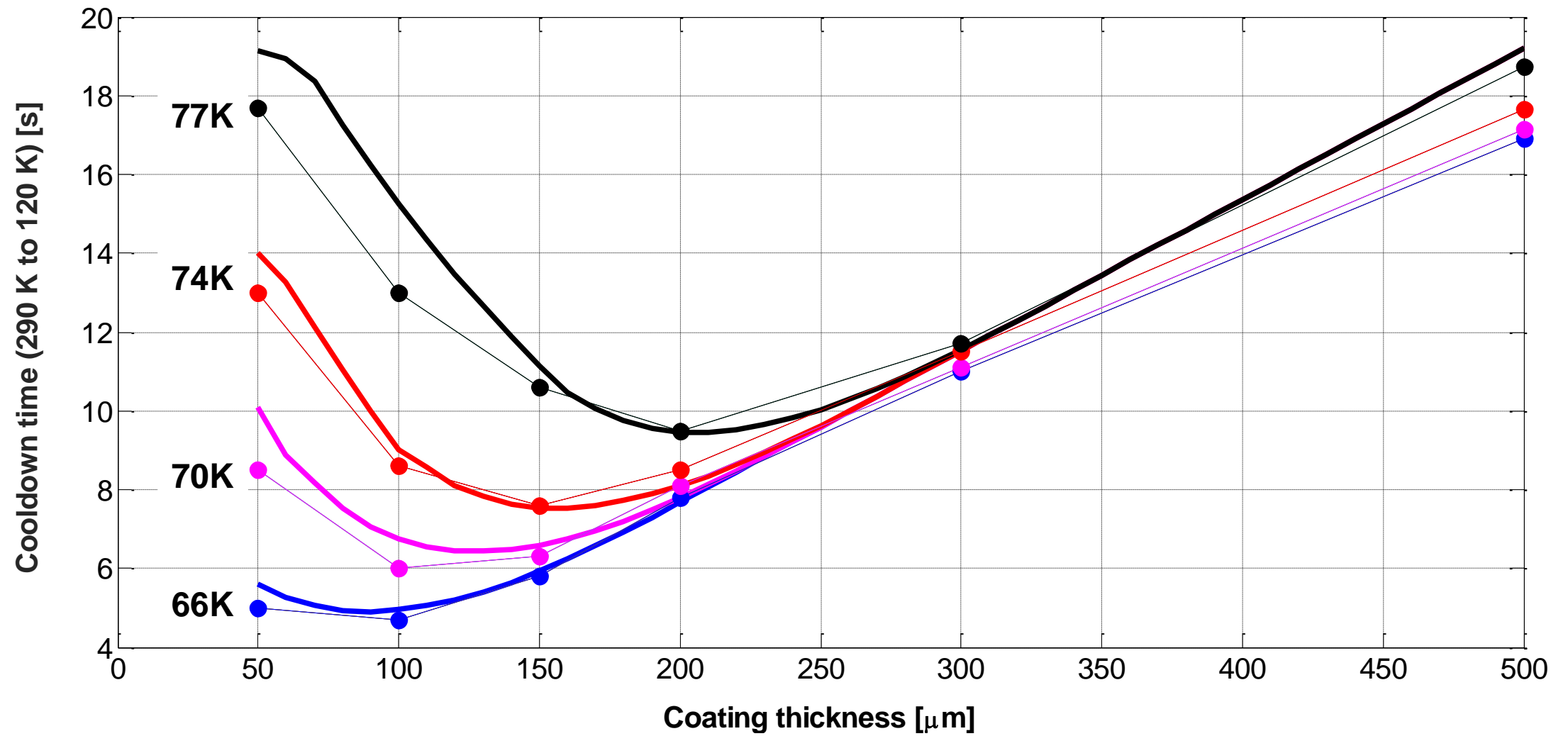
- The optimum value of coating thickness -
 - reduces with the degree of **liquid subcooling**.
 - reduces for higher **critical heat flux** values.
 - reduces with lower values of **coating thermal conductivity**.
- Surface temperature measurements and visualization of the boiling regimes is recommended for in-depth understanding of all the boiling regimes.

Thank you !

Bonus slides !



- A to B** - Nucleate boiling regime
- A*** - Inversion point
- B** - Critical Heat Flux
- B to C** - Transition boiling regime
- C** - MFBT
- C to D** - Film boiling regime



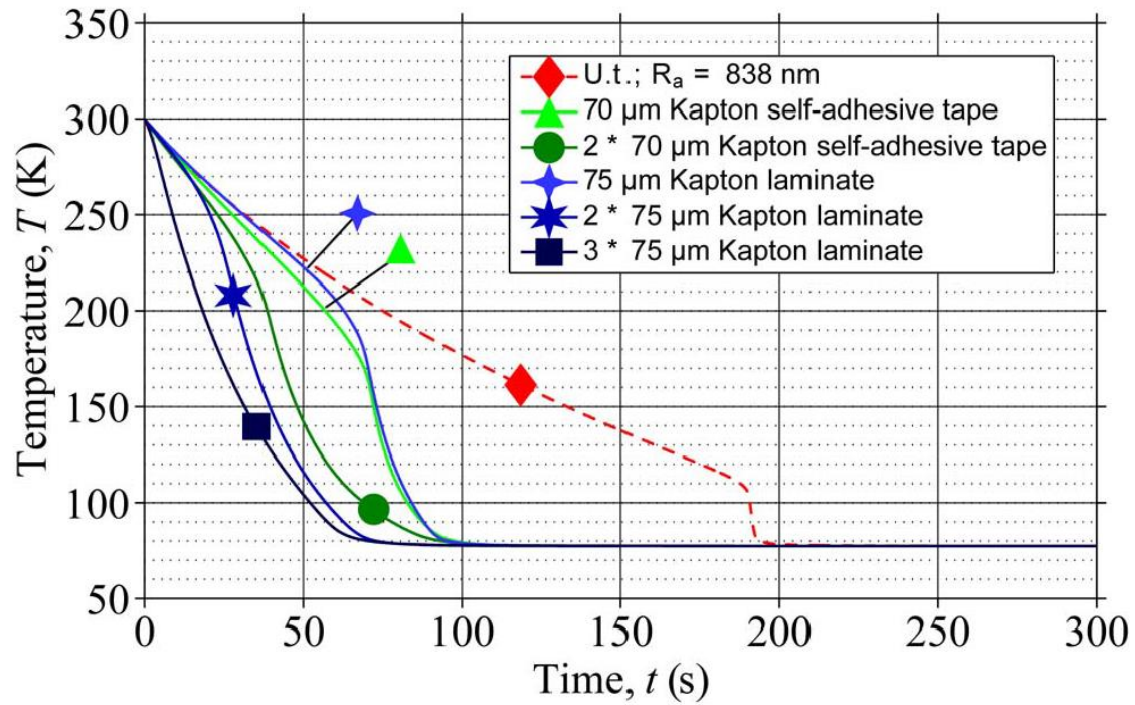


Fig. 6. Sample temperature versus experiment time while cooling from RT to 77.3 K for the samples with different surface lamination. The untreated sample (u.t.) is added for comparison purposes.

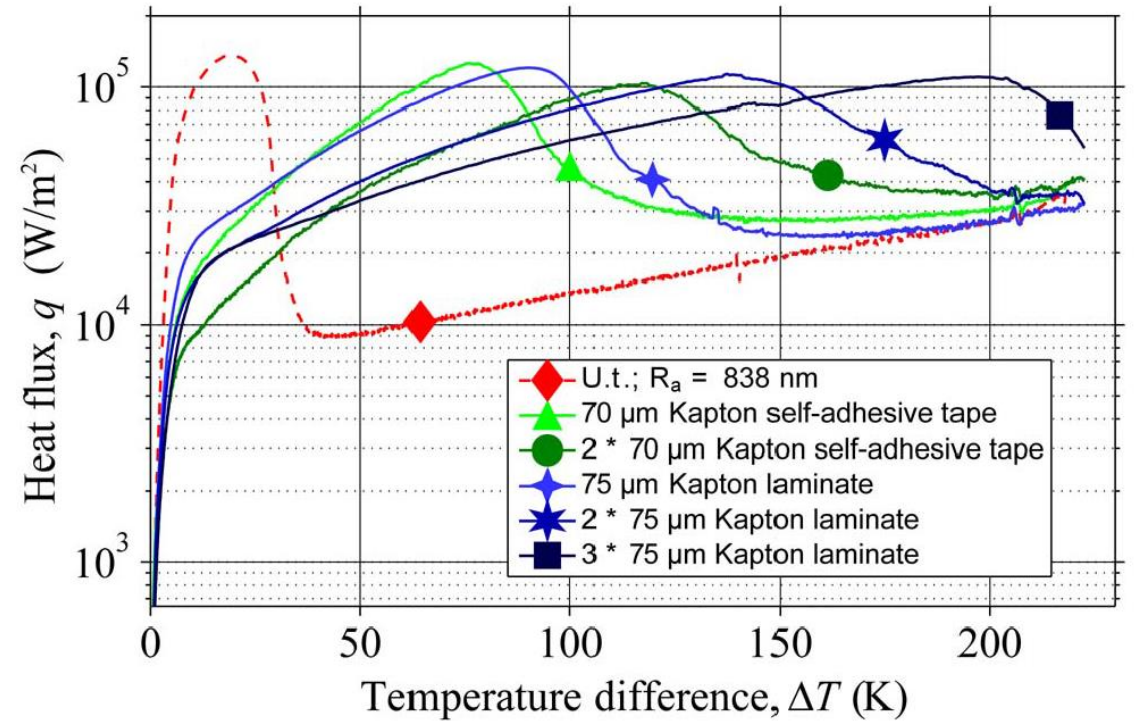


Fig. 8. Calculated heat flux for the group B samples with different surface lamination. The untreated sample (u.t.) is added for comparison purposes.

- Samples were machined copper cubes with a length of the edge of 30 mm.

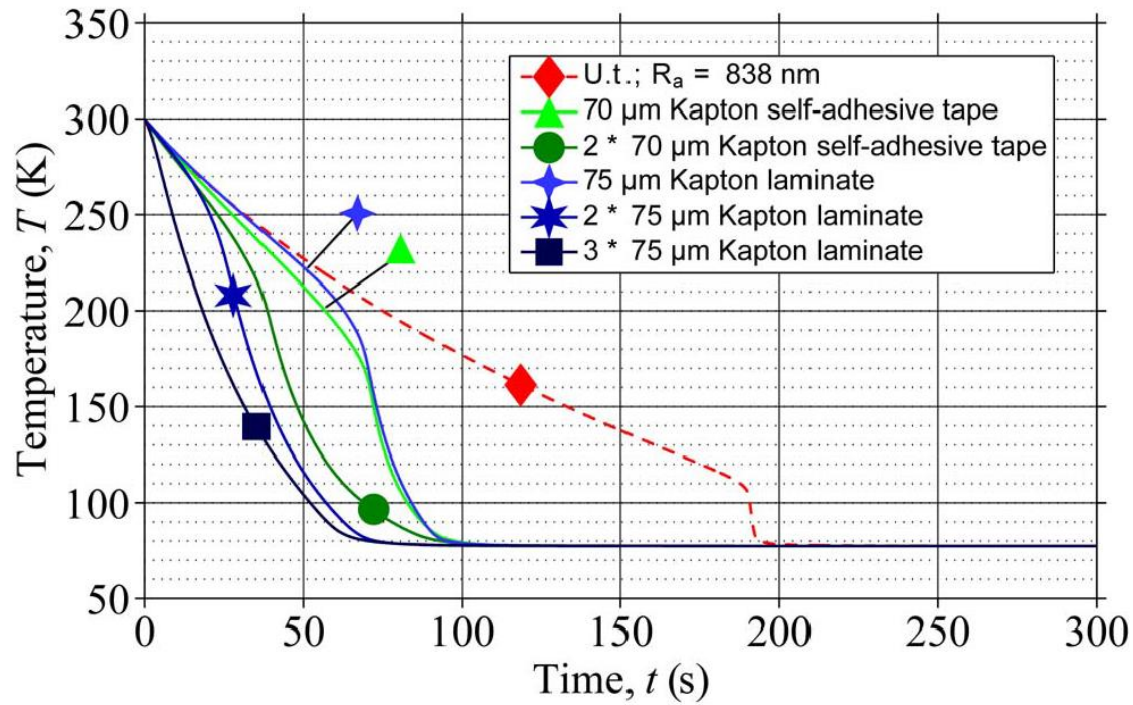


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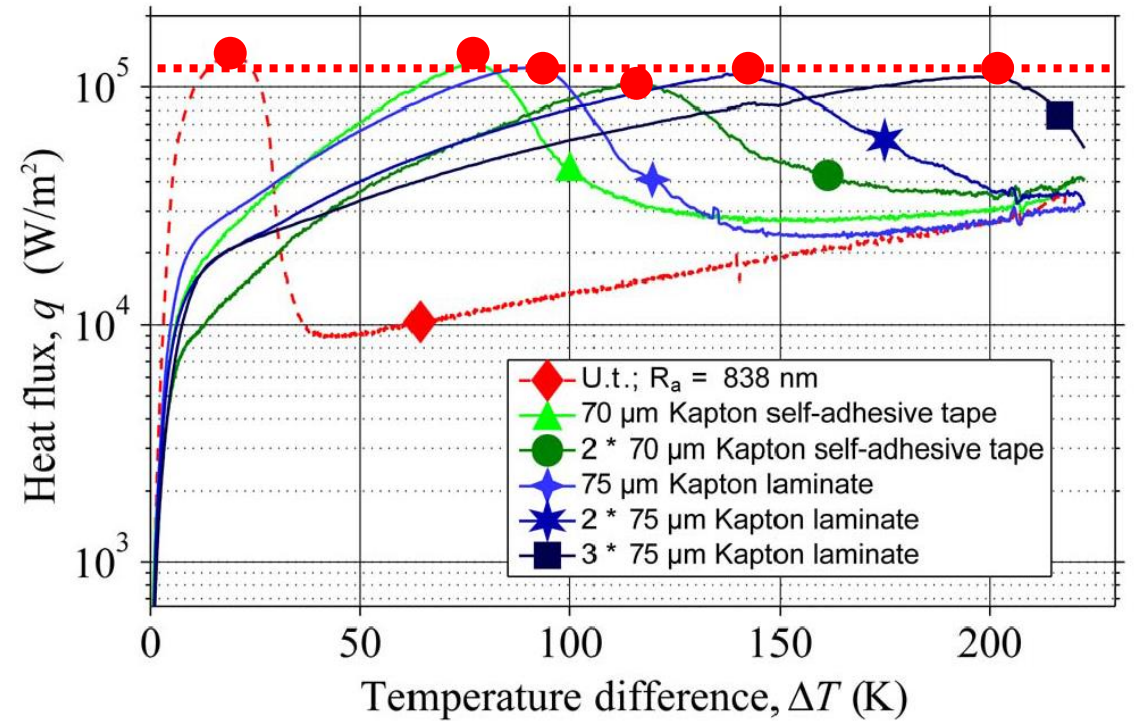


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