Experiment Report

陳昱瑋

Chen Yu-Wei

國立交通大學電子工程所

yuweiichen@gmail.com

Web: www.yuweiichen.com
GitHub: www.github.com/yuweichen1008

Outline

- Experiment Setup
- Simulation Parameters
- Solution on binding
- Unsolved Problem
- Experiment

Experiment Setup

✓Thermal Sensors probe (1~100°C)

✓Flow sensors (G ½")

✓Valve

✓Tubing

✓Connector (3/4" to 8 mm)

✓Pump (45W, bought)

☐Pressure Chamber(with gauge)

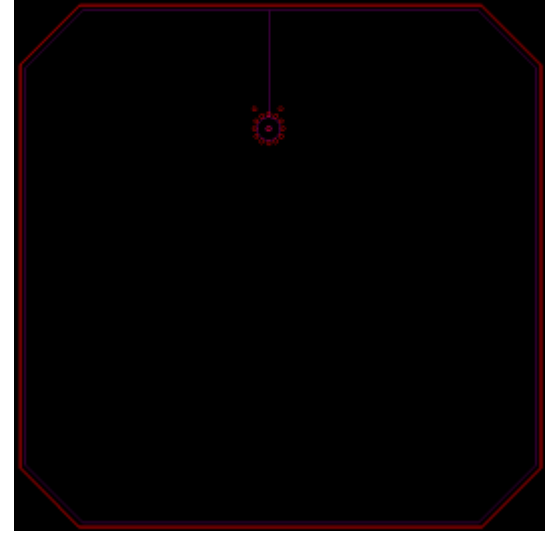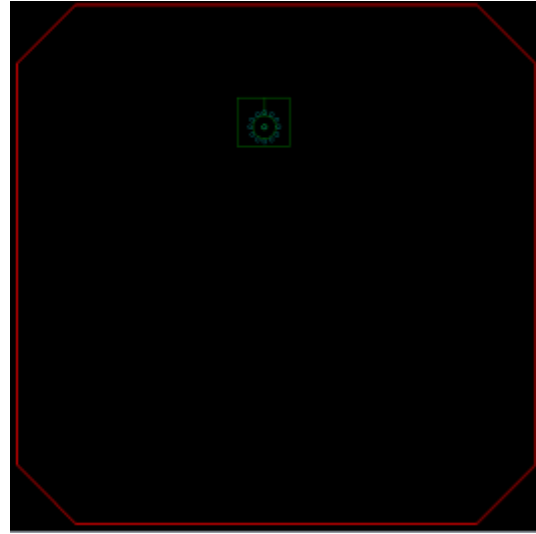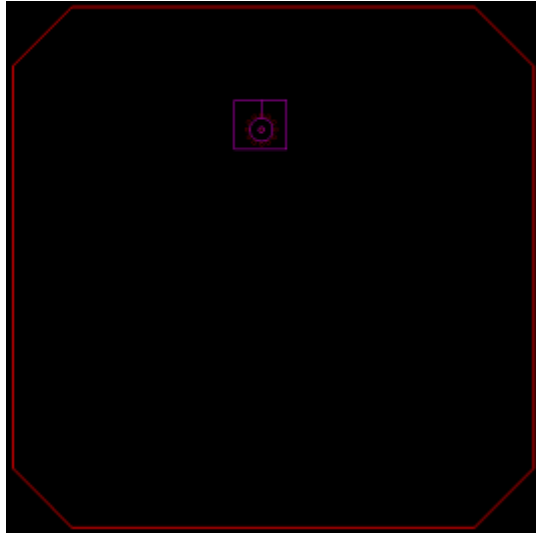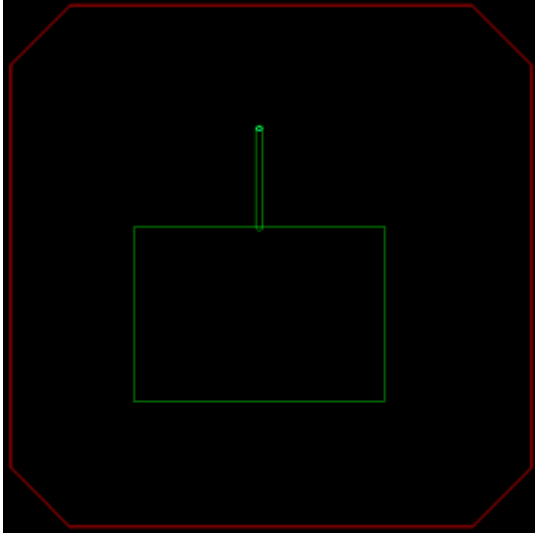☐Power Source

Experiment Flow chart

Unsolved Problem
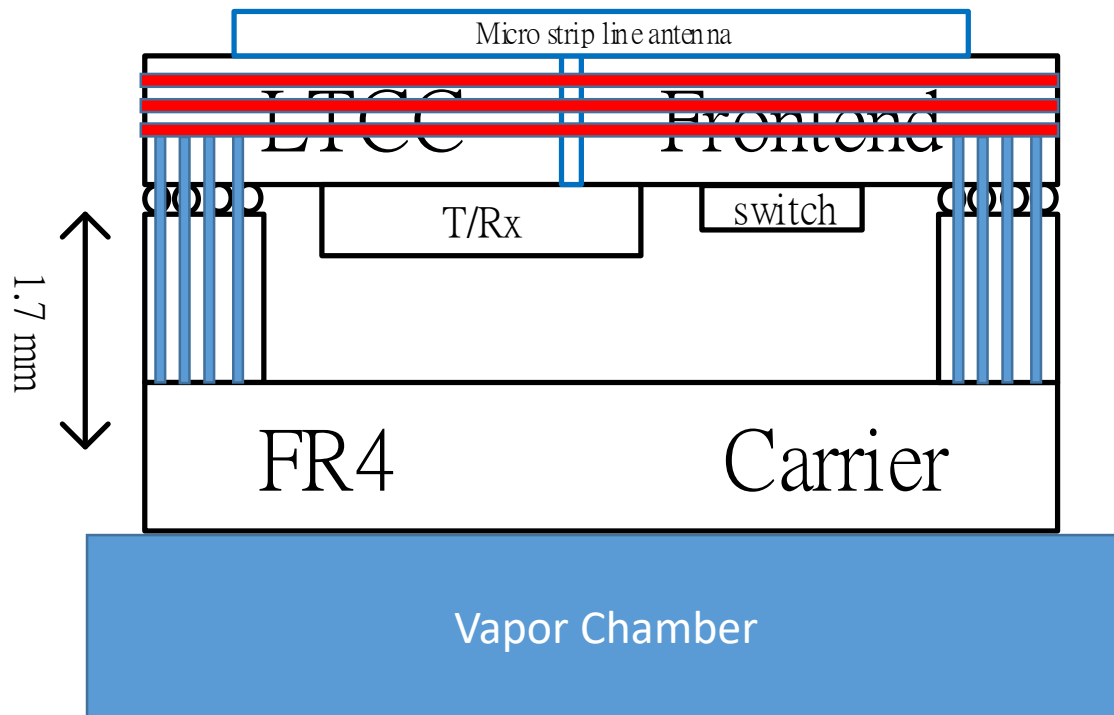
- Problem 1:
  - Heat accumulation

    heat might accumulated on top metal layers according to the figure

- Problem 2:
  - FR4 drilling

    The accurate depth of the pit for T/Rx is 1.16 mm, CNC is more suitable in this cooling case for PCB drilling will cover a thin layer on top of surface, which is not optimal for cooling.
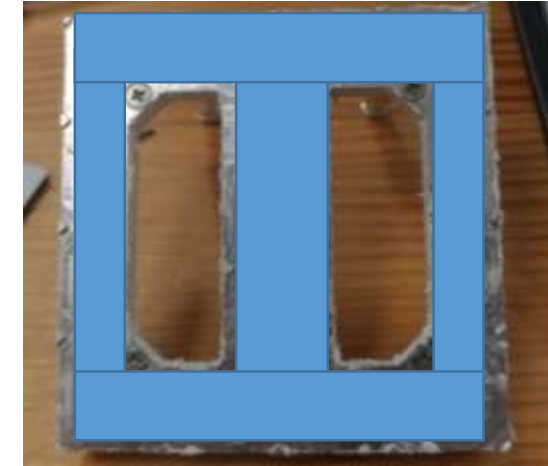
LTCC module
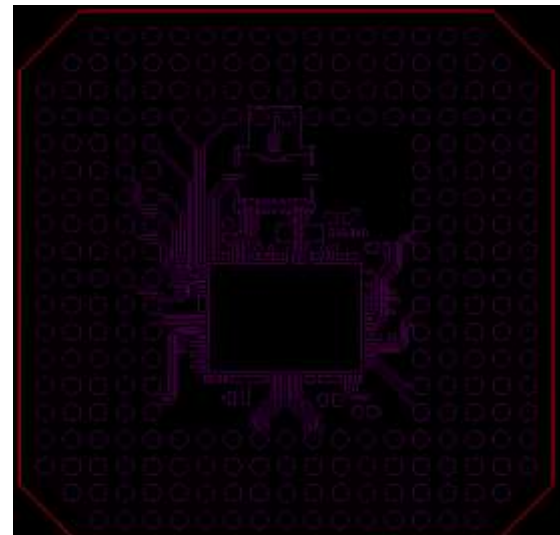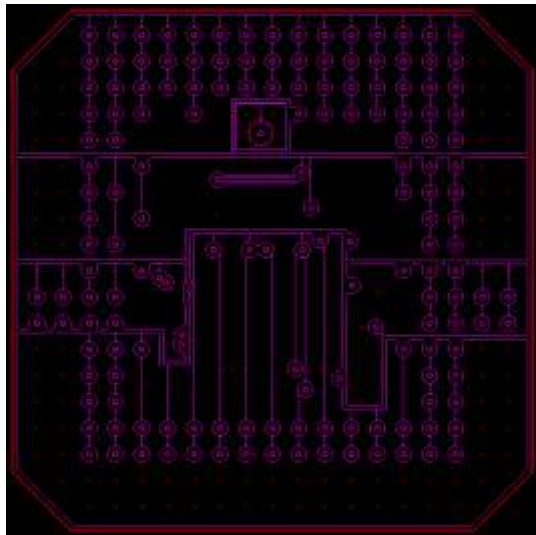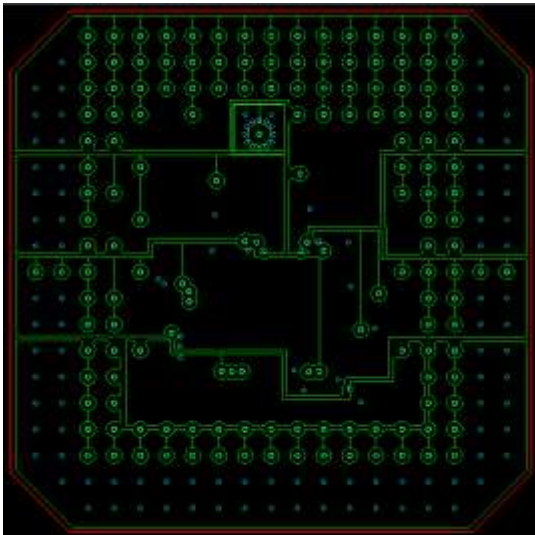
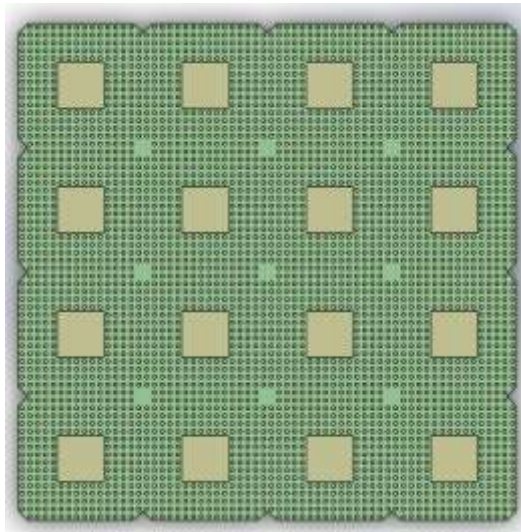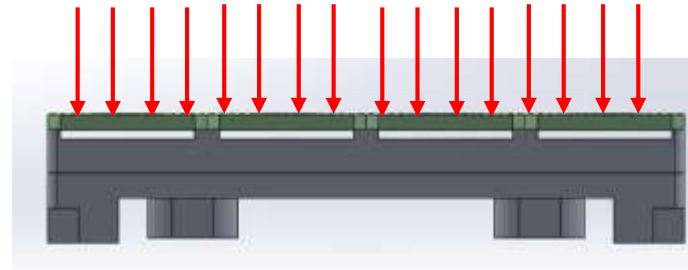# Bonding PCB to Aluminum Structure

Assembly cell structure

Clean Anodize Vapor Chamber Surface

Pre-apply Thermal Tape

Aligning the PCB on VC


Pressure on both side

Tape Layer Thickness
Less than 150-200um

Thermal Tape

- 3M 8805 High Adhesion Thermally Conductive Adhesive Transfer Tape
- Thickness: 5 mil (0.13 mm)
- Conductivity 0.6 W/m-K
- Adhesion: 5.8 @RT N/cm

✓ Problem: Aluminum Surface is wet-out, which cause the tape less adhesive on vapor chamber side

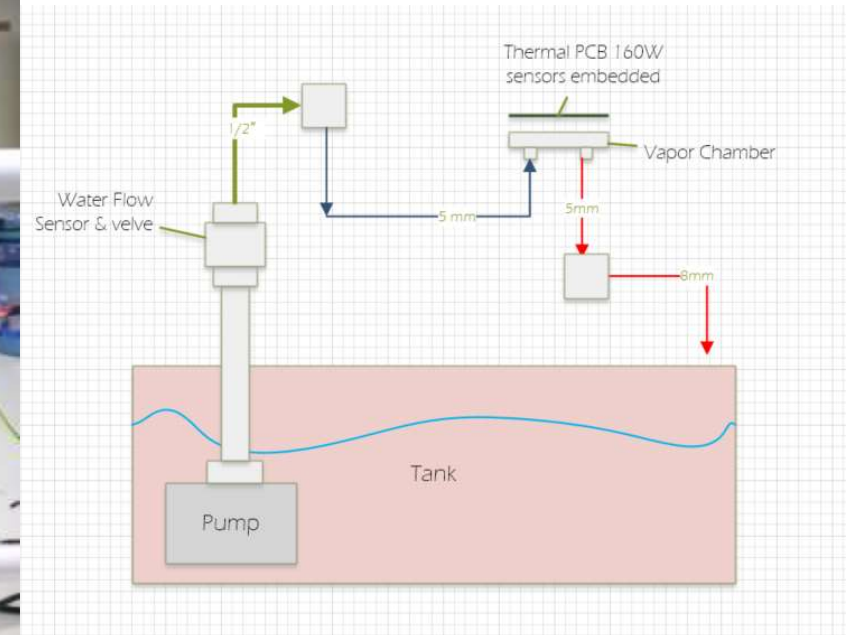➢ Solution: coarse the surface with scratches (or silicone)
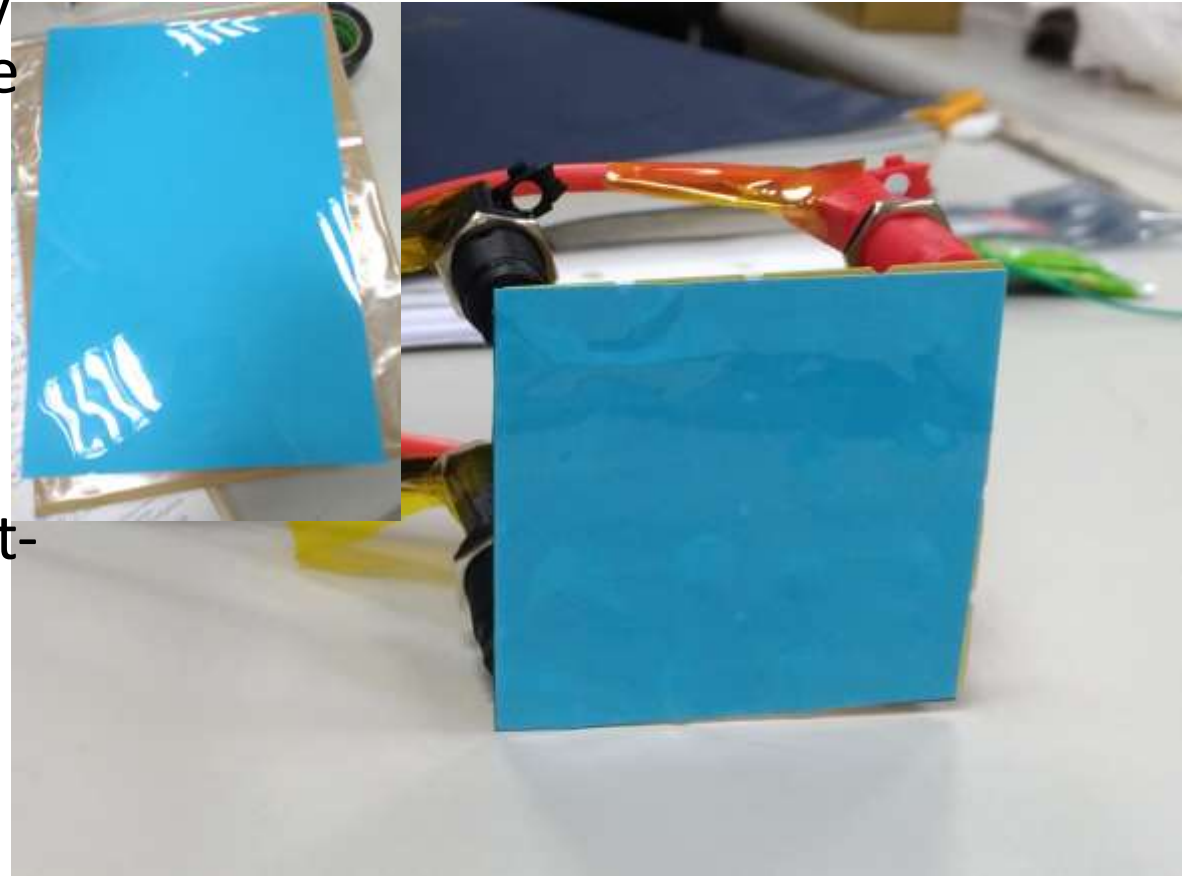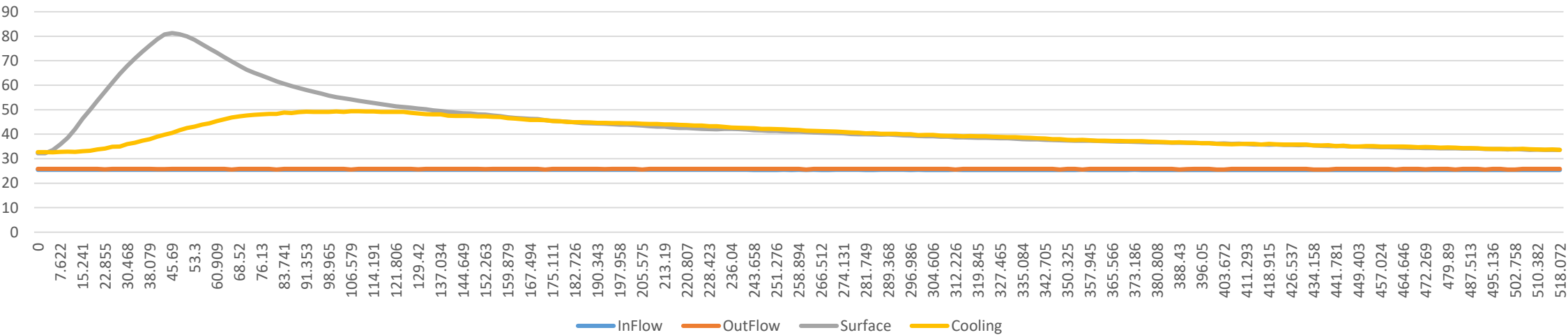
Tape Configuration
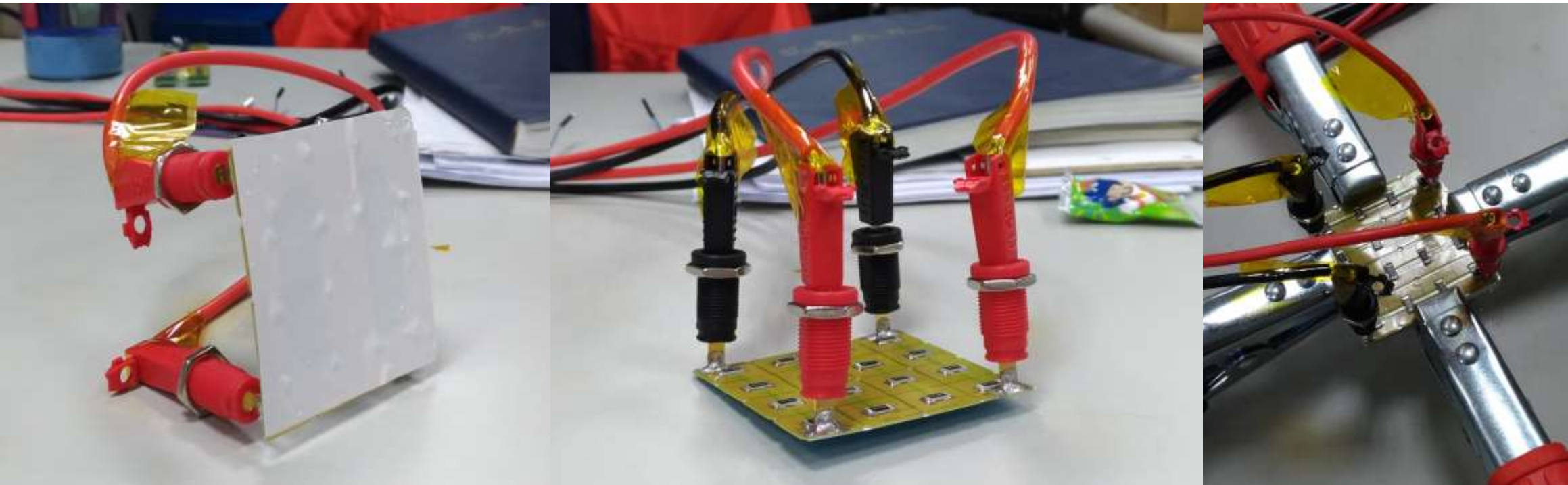
Experiment Setup

- Tube: 8 mm 12 mm tube (in ISO)

- All the sensors are in 12 mm tube; while the in/out of vapor chamber is 8 mm

- Surface and vapor chamber temperature sensor does not attach to the surface directly, only for the reference purpose.
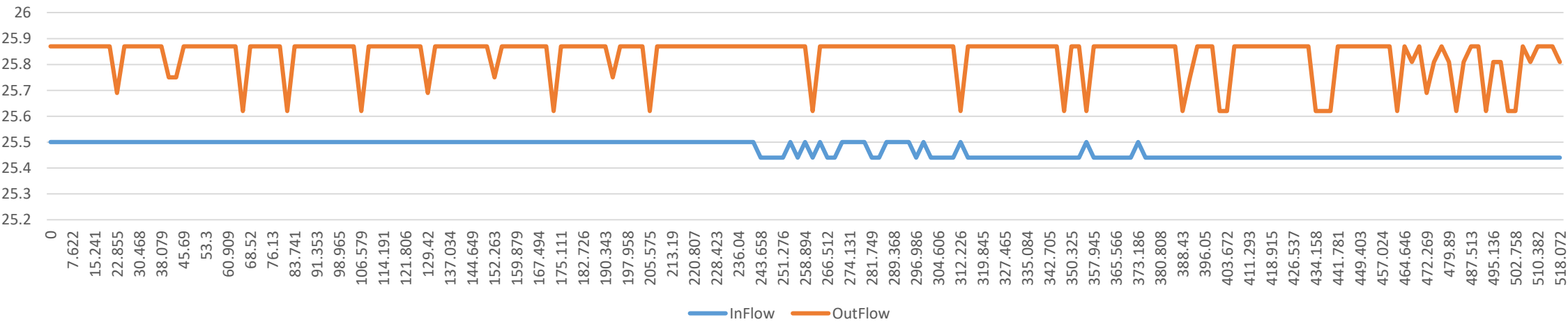
No Flow Temperature chart

Flow Temperature chart
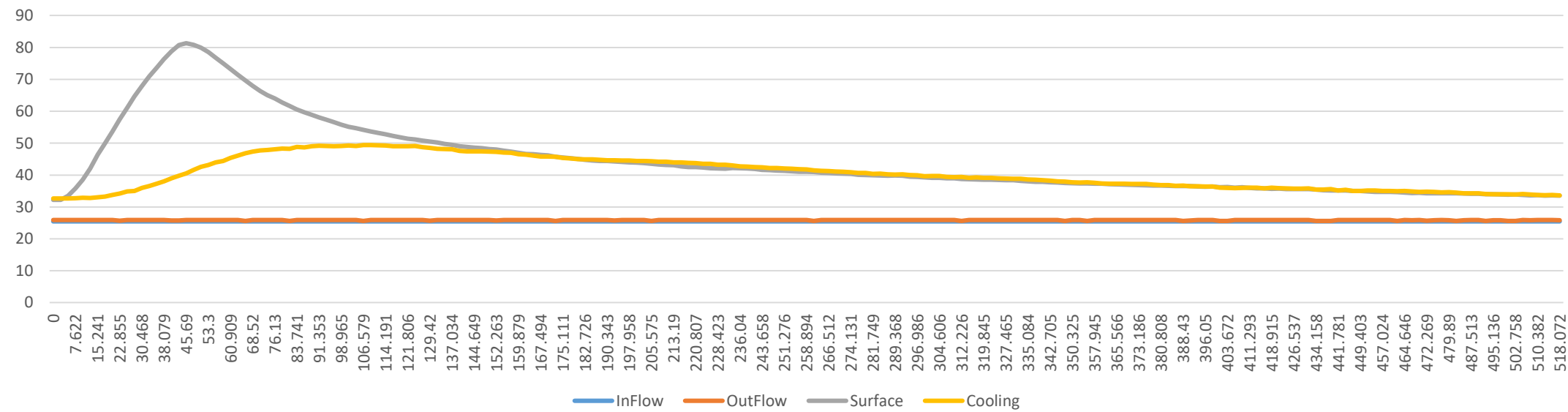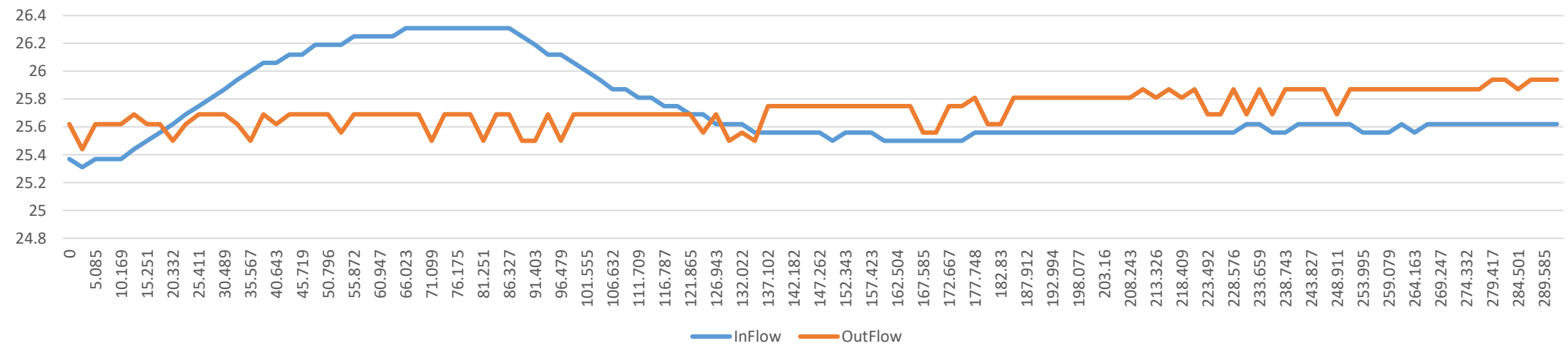

Flow Experiment

No Flow / Flow compare

NoFlow - Flow Compare

No_in — No_out — F_in — F_out

Data Format and Parser

Future works

- Test out what's the best adhesive for aluminum surface (Ra 6.3)
- Design the next version based on current experiment result

Thank you