NOVEL MOISTURE ANALYZER WITH A QUICK RESPONSE FOR ACCURATE MONITORING OF LITHIUM ION BATTERY MANUFACTURING

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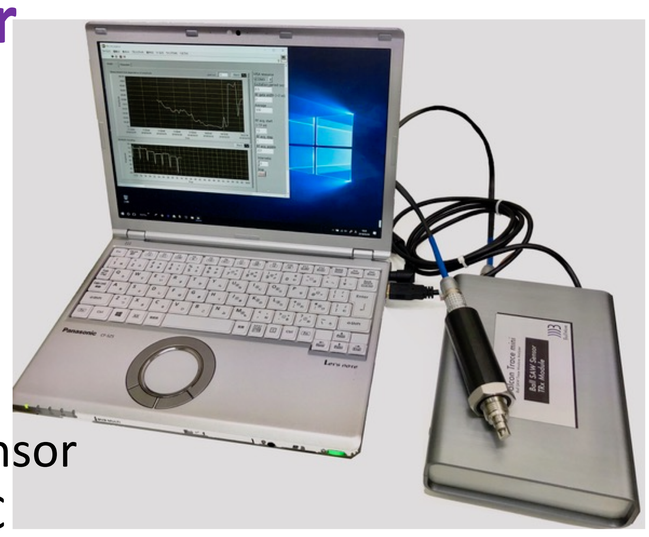
1. Introduction

- It is important to control the trace moisture in a dry chamber for the production of lithium ion batteries(LIB) because the materials react with water molecules.
- It is important, too, to evaluate the trace moisture during the vacuum-dry process of electrodes materials after the wet-coating.

2. Objective

- To monitor the trace moisture in a load lock chamber with a time resolution of a second.
- To measure the trace moisture in a vacuum-dryer during the vacuum-dry process of wet-coated electrodes.

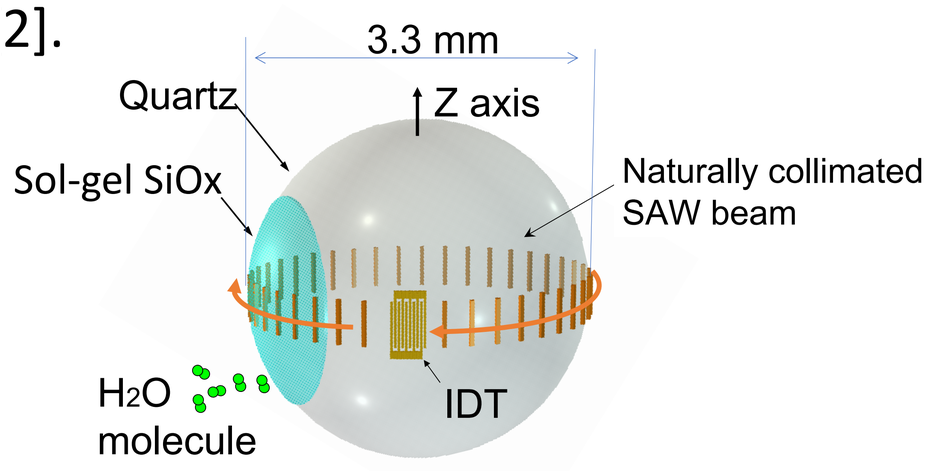
3. Moisture Analyzer A Prototype of FTm [1]



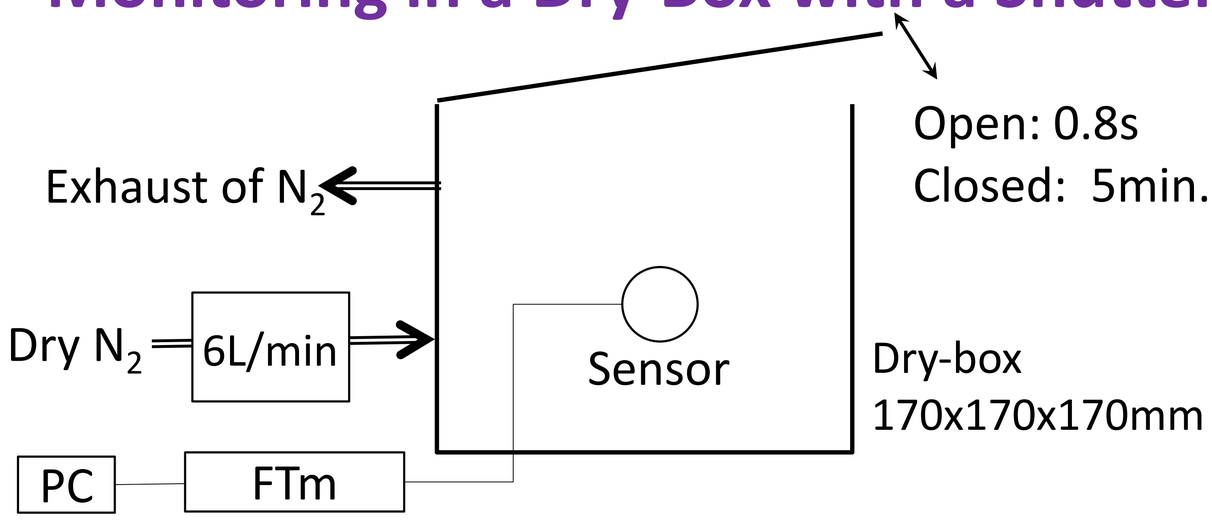
- Sensor: Ball SAW sensor
- Control: USB from PC
- Power: USB from PC
- Size & mass: 180X130X50mm, 400g
- Range: -70 ～ -20 ℃ (FP)

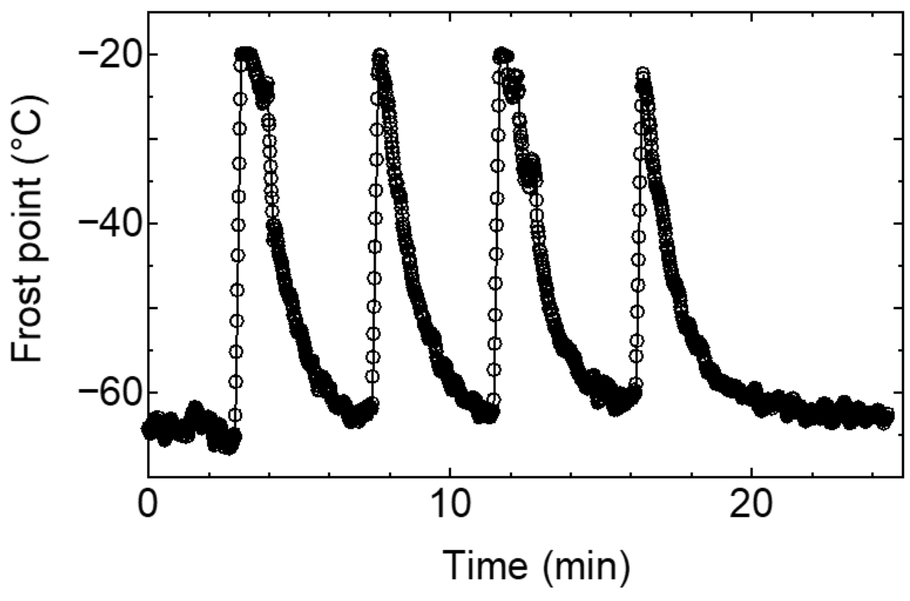
4. Sensing Mechanism

- We developed a trace moisture analyzer by using a ball surface acoustic wave (SAW) sensor coated with a sol-gel silica sensitive film [2].

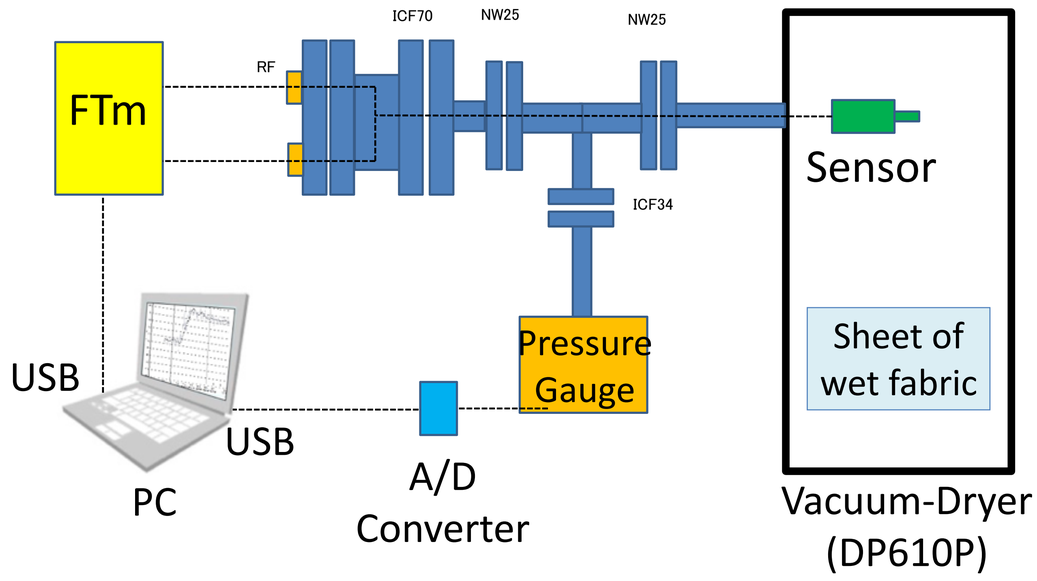


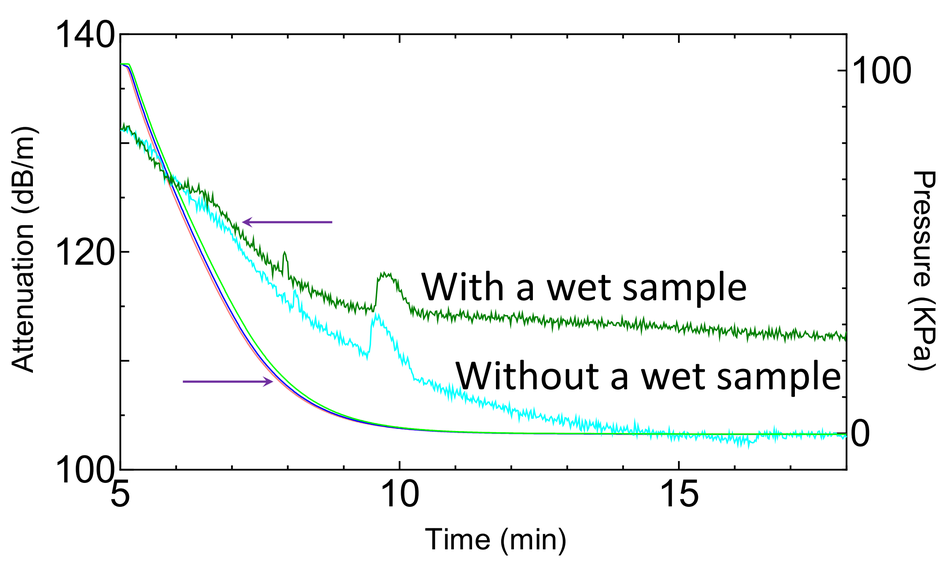
5. Experiment I Monitoring in a Dry-Box with a Shutter





6. Experiment II Monitoring of Vacuum-Dry Process





7. Conclusion

- A portable moisture analyzer detected the trace moisture at -70 ～ -20 ℃(FP) with a response time less than one second.
- Useful for monitoring the trace moisture in a dry load lock chamber and in a vacuum-dryer.

8. Reference

[1] K. Yamanaka, et. al., Jpn. J. Appl. Phys.,56 (2017) 07JC04
[2] N. Takeda, et. al., J. Thermophysics, 36.7 (2015) 1-13.