



Engineering Creativity

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What is Engineering Creativity?

- ✓ Engineering Creativity is held in the second semester.
- ✓ We chose “Metal leaf” course.

Experiment



Presentation





Metal Leaf

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What is the Metal Leaf ?

In some conditions, metal deposits like a leaf. We call it “metal leaf”.

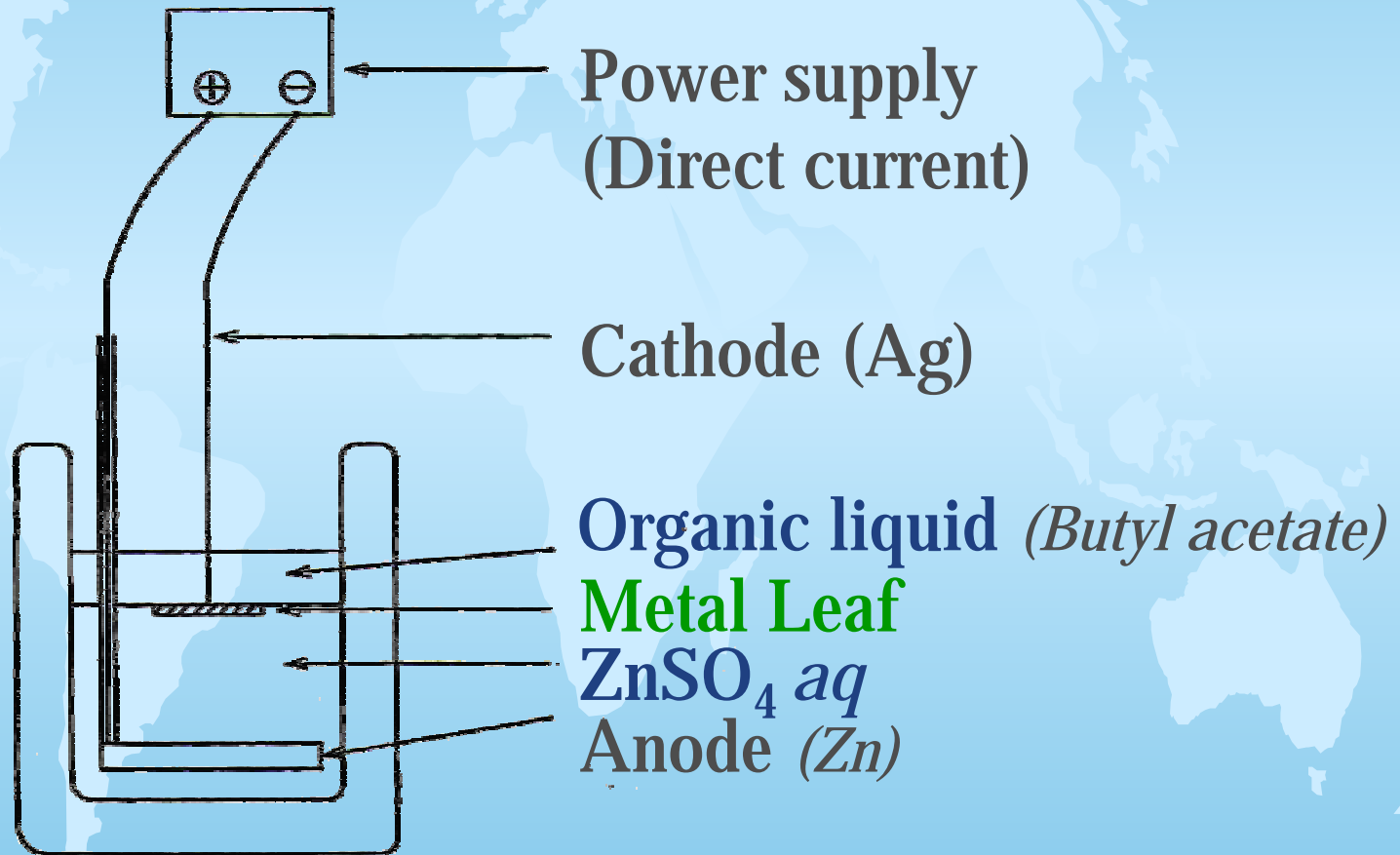
Today, We still don't know factors to control metal leaves growth.



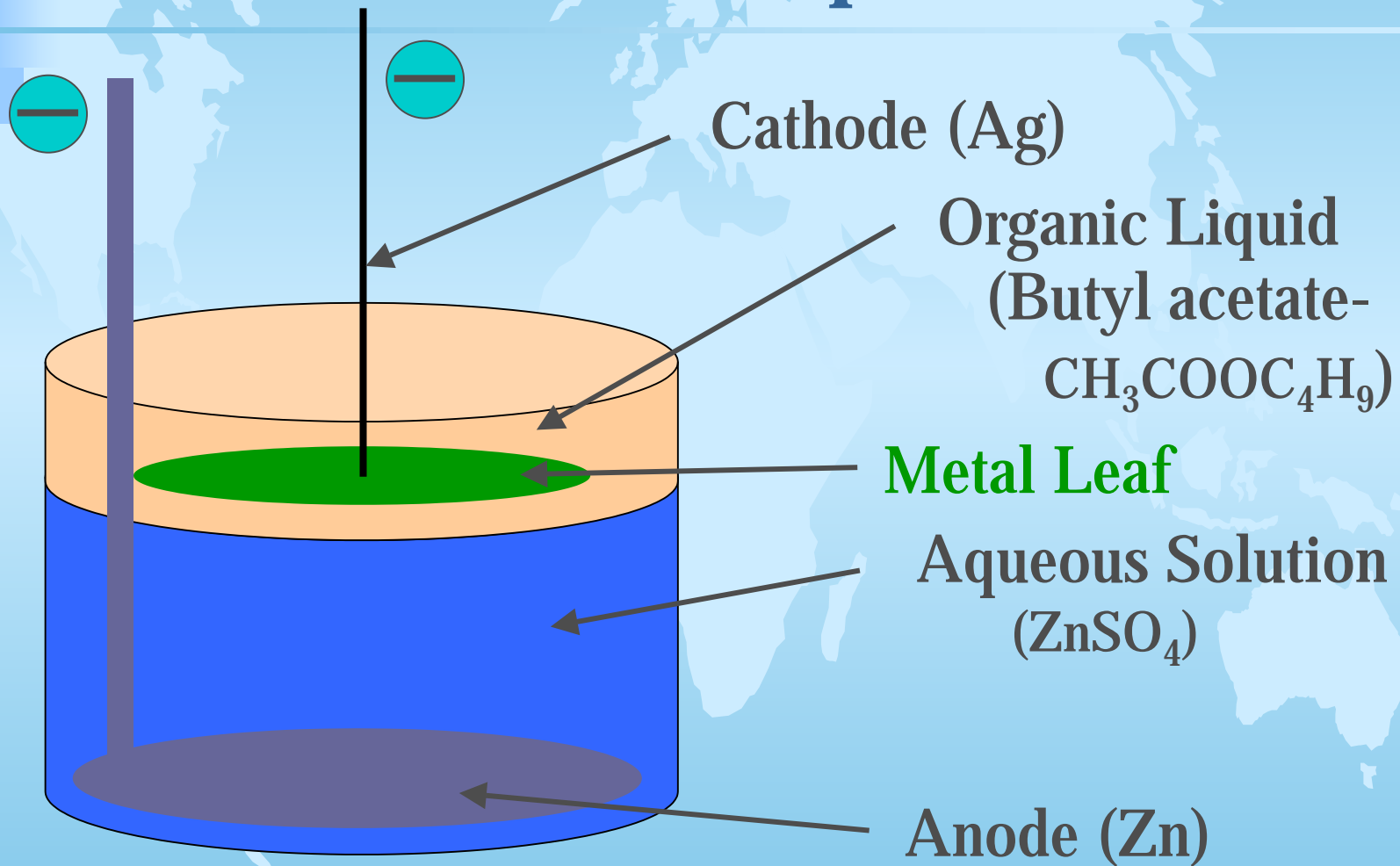
The purpose of this experiment

Our purpose is to examine factors to control metal leaves growth.

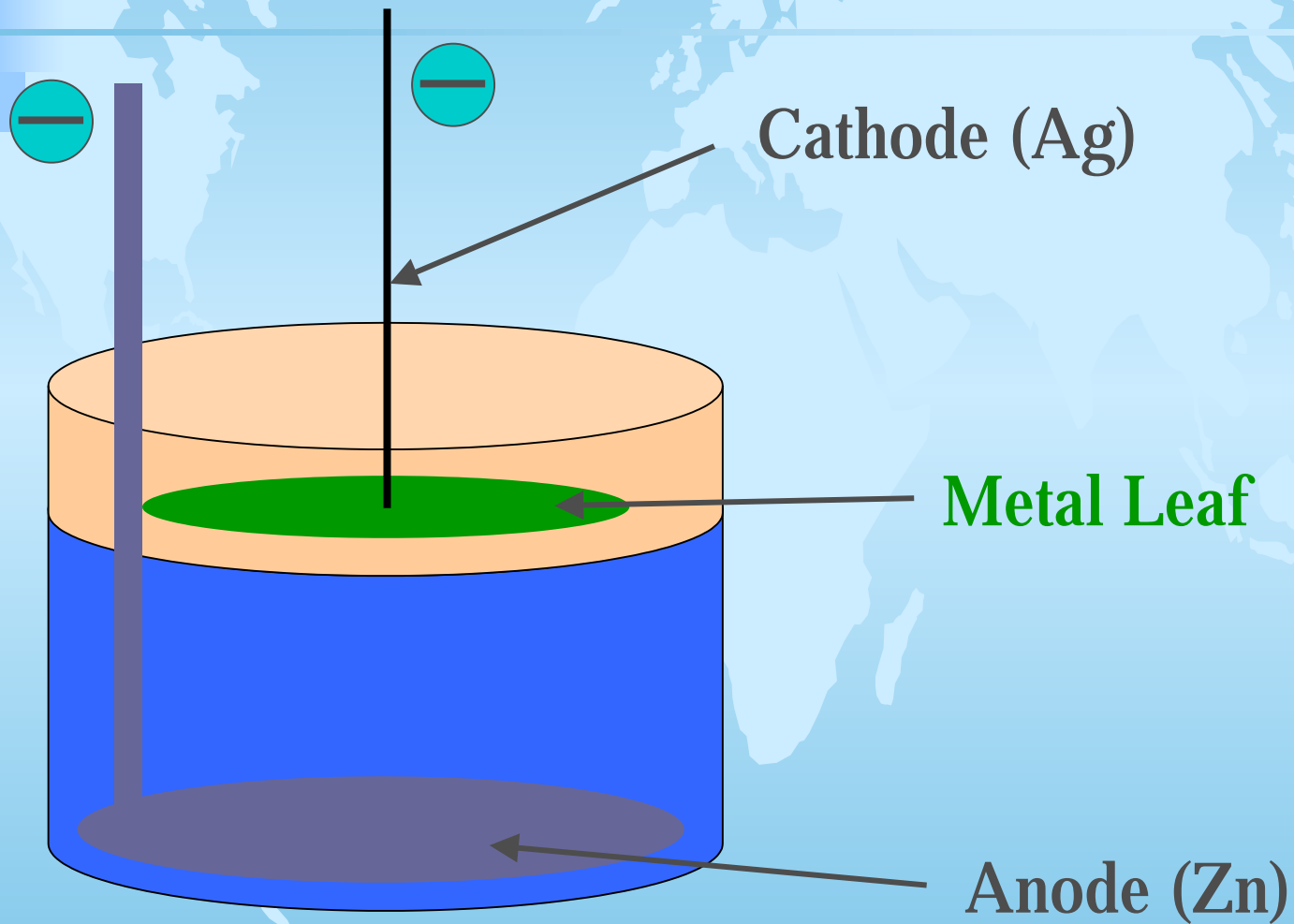
The apparatus of this experiment



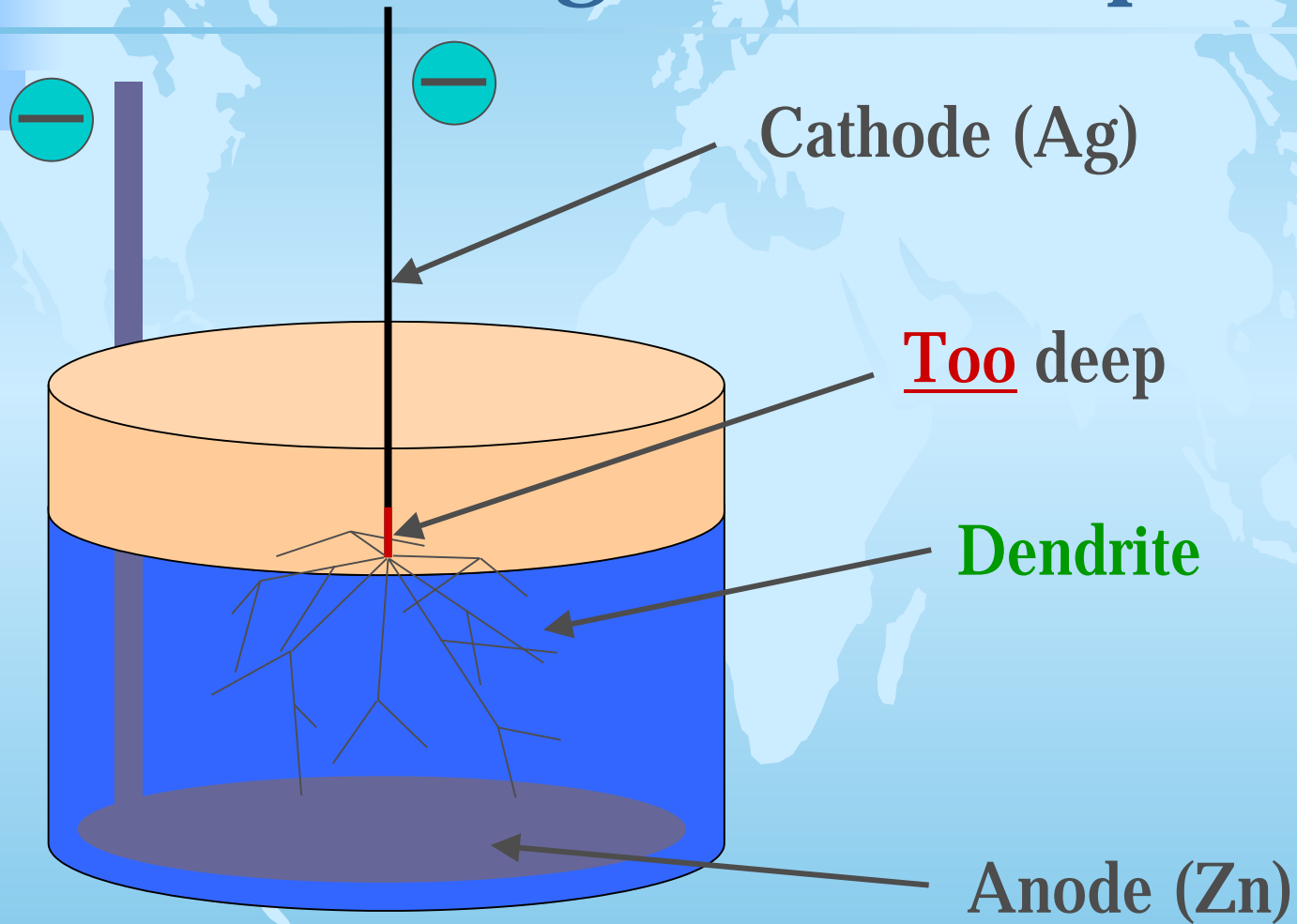
How to do the experiment ?



If Wire sets at the interface...



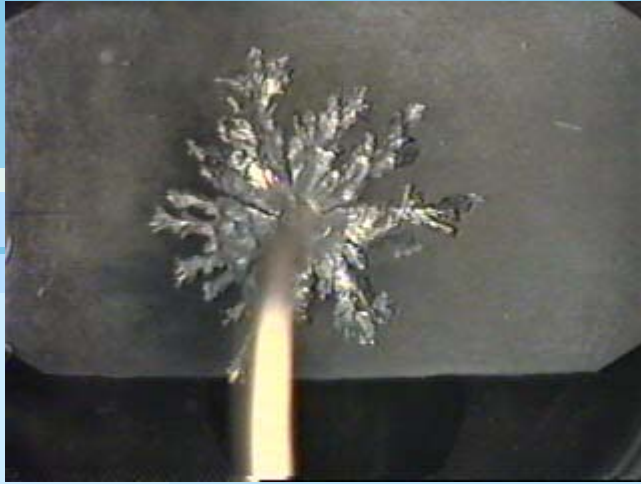
If Wire goes too deep...



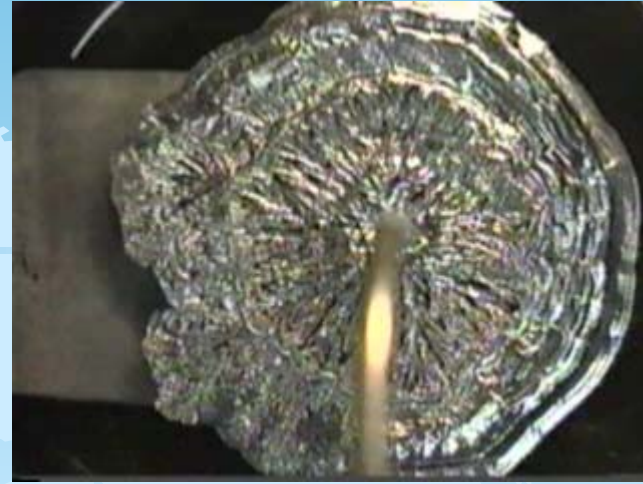


Experimental Condition

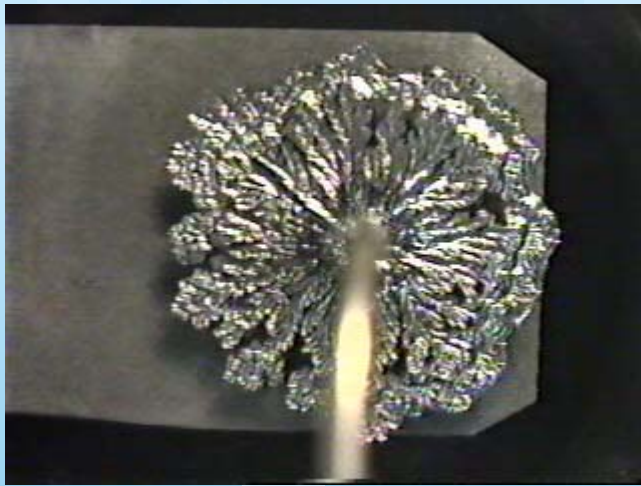
- ✓ Temperature : Room temperature
- ✓ Voltage : 2V ~ 7V
- ✓ Distance between anode and cathode : 3mm ~ 20mm
- ✓ Shape of anode : Circle , Star , Rectangle
- ✓ Depth of *Organic liquid* : 2mm ~ 5mm



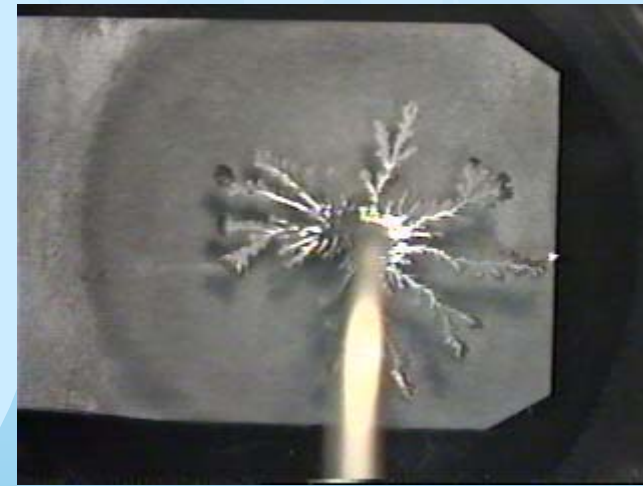
2V



3V

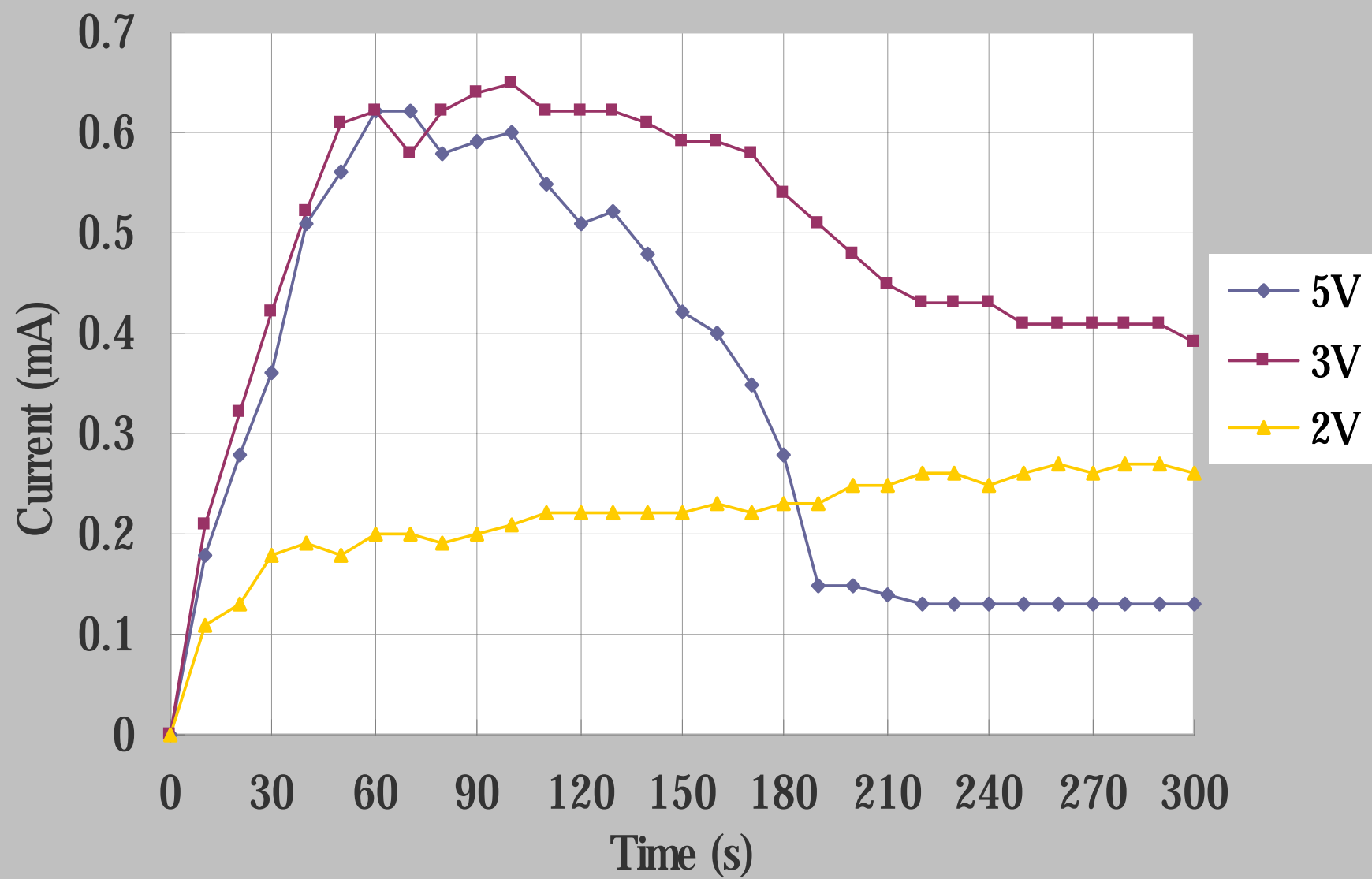


5V



7V

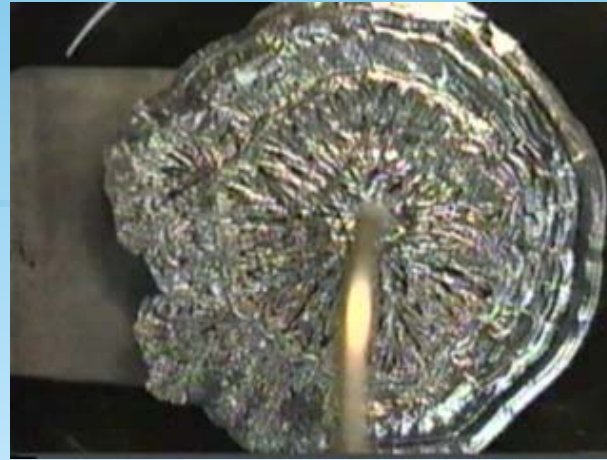
Voltage dependence of metal leaf growth



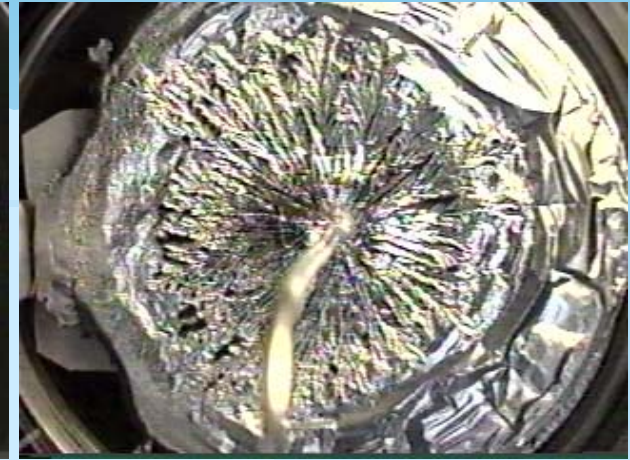
Current - Time



5mm



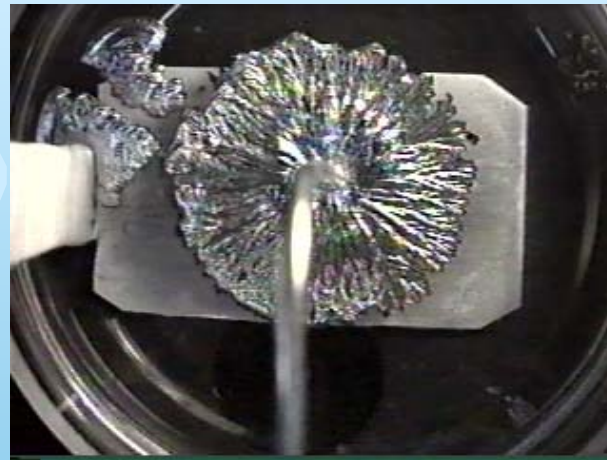
7.5mm



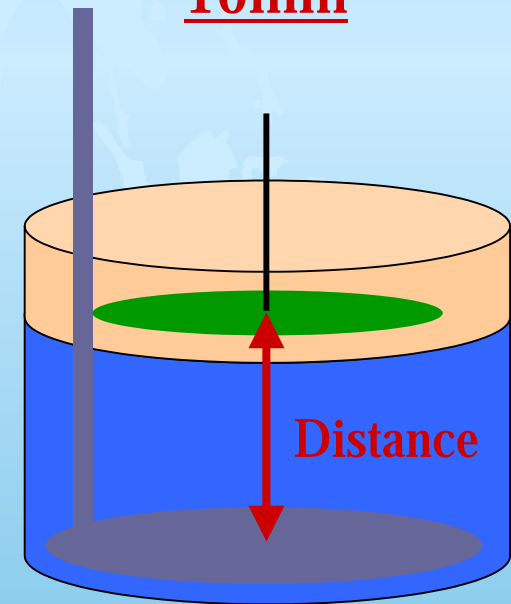
10mm



15mm



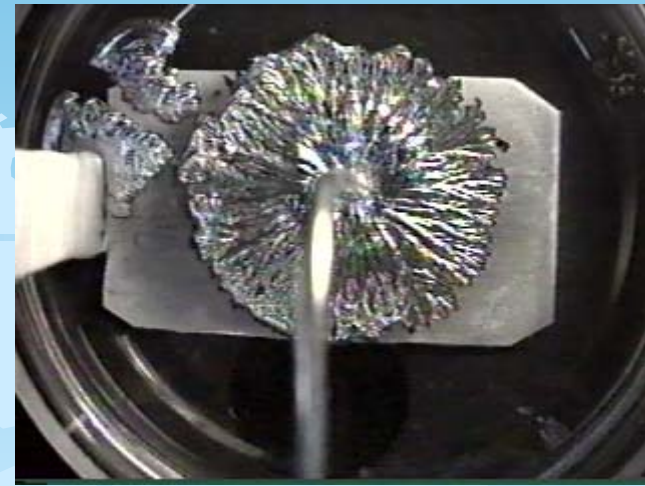
20mm



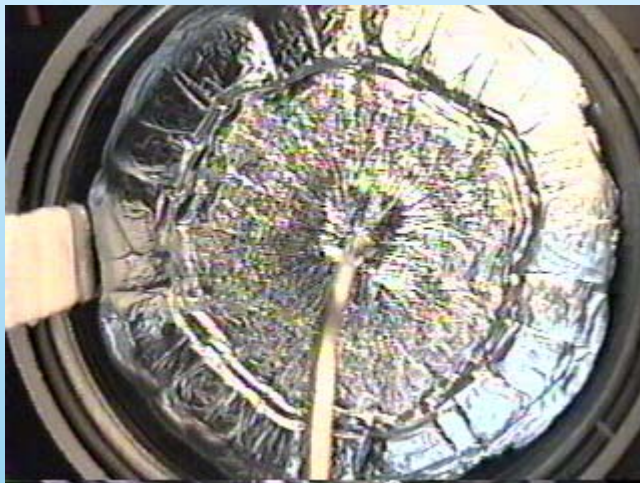
The effect of distance between electrodes



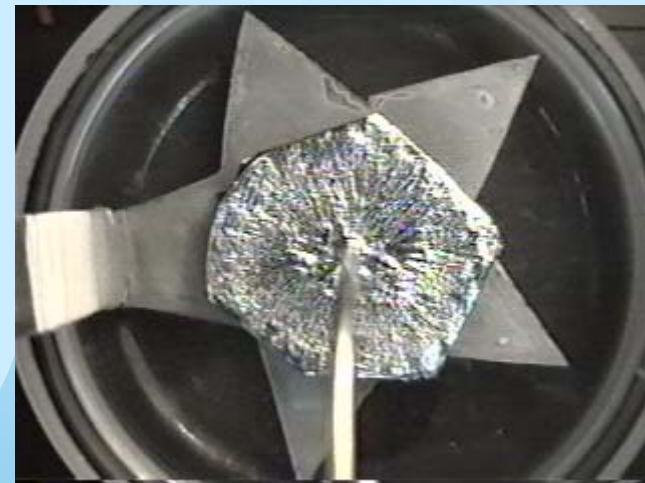
Rectangle (10 × 20)



Rectangle (35 × 60)



Circle (Diameter is 70mm)

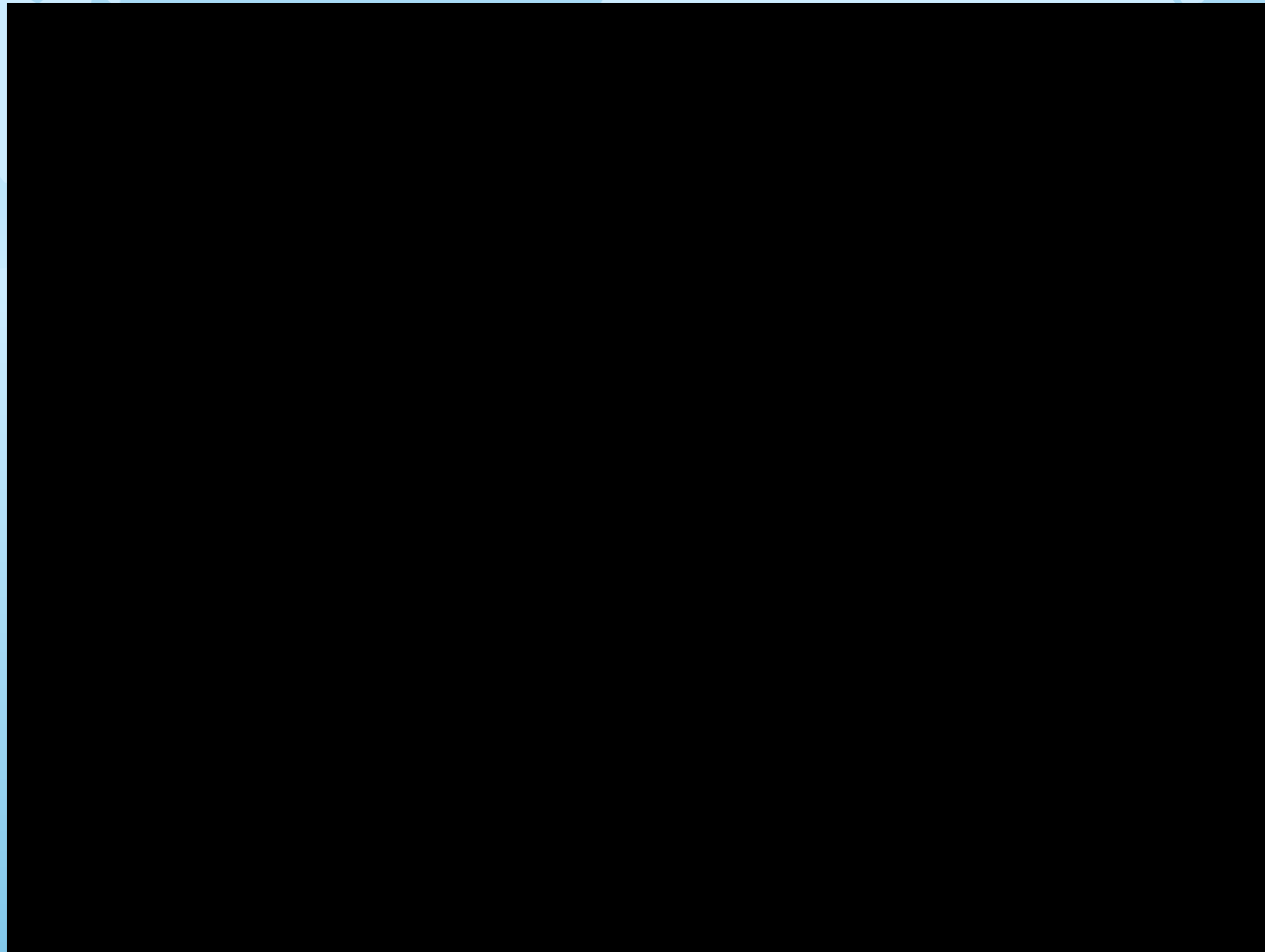


Star (Diameter is 70mm)

Relation between Anode shape and metal leaf growth

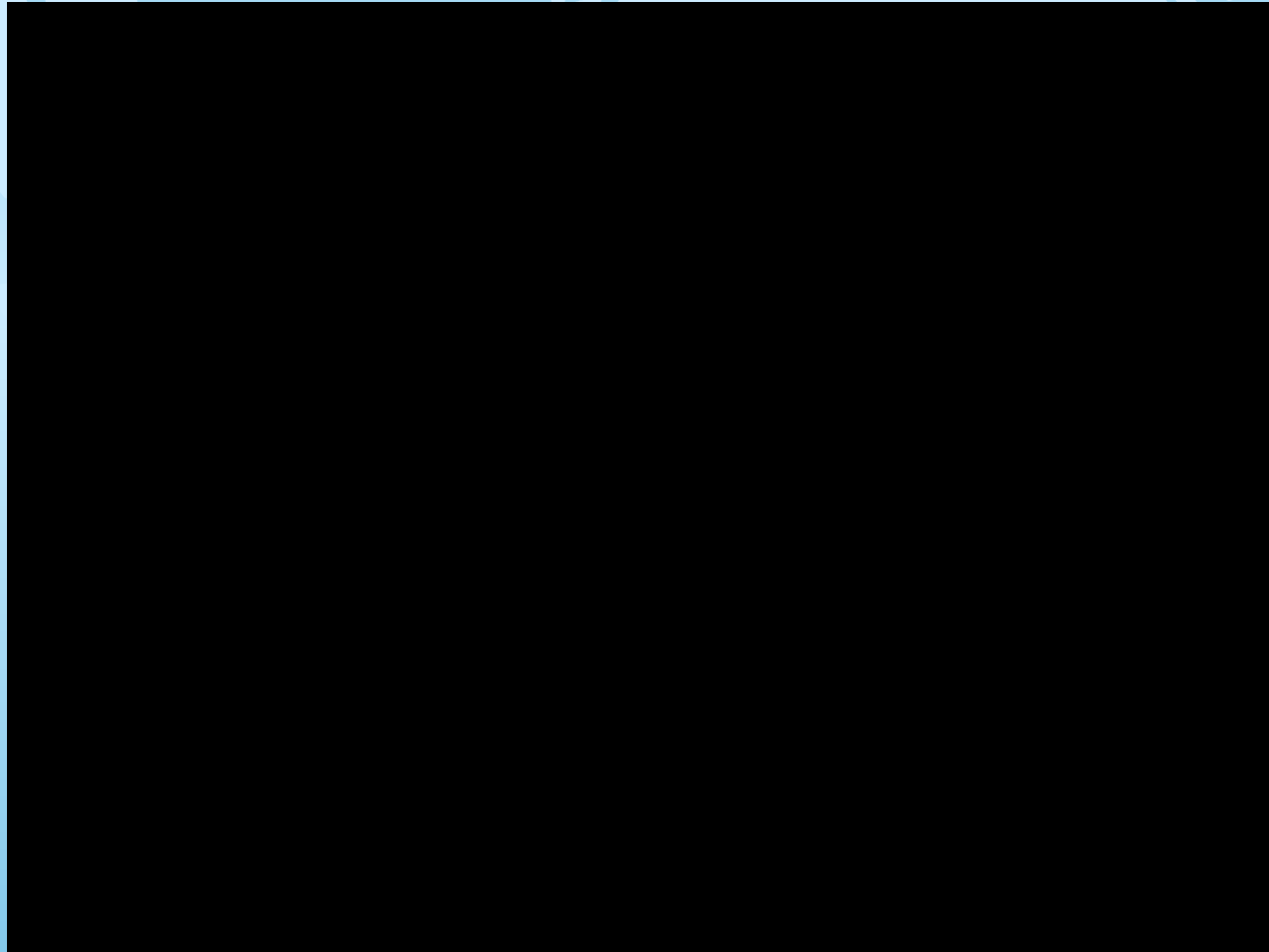


Metal leaf growth on the circle



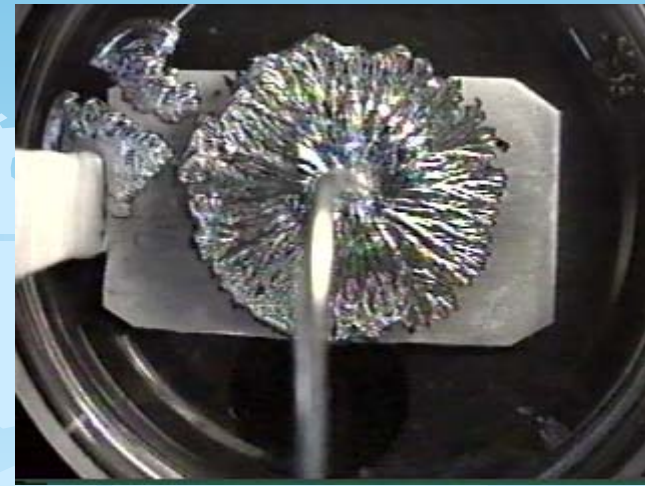


Metal leaf growth on the star

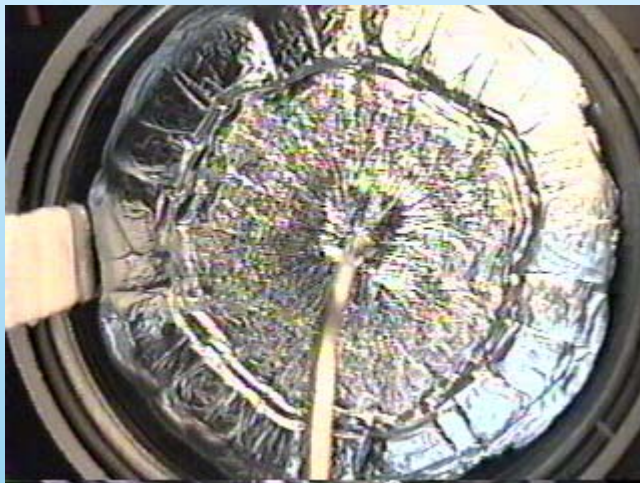




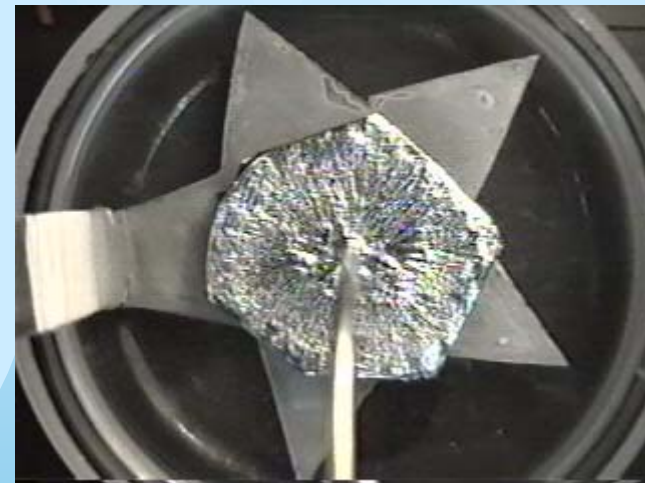
Rectangle (10×20)



Rectangle (35×60)



Circle (Diameter is 70mm)



Star (Diameter is 70mm)

Relation between shape of anode and metal leaf growth

Conclusion

The best conditions ;

- ✓ Voltage : **3V.**
- ✓ Distance between electrodes : **10mm.**
- ✓ Shape of anode : **Circle.**
- ✓ Size of anode : **The bigger, the better.**

We would like to investigate its mechanism.



Memories of our study

- ✓ We got confidence and a good experience.
- ✓ Doing experiment was difficult but it was actually interesting.
- ✓ We were interested in the experiment.
- ✓ We realized the mysteries of science.



Acknowledgement

- ✓ Professor Tsutomu Yamamura
- ✓ Hideki Maekawa (Assistant professor)
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Thank you for your

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Consideration

