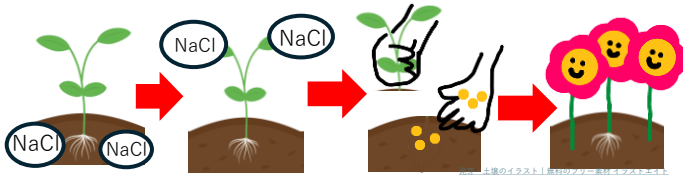


Are Ice Plants Effective for Salt Damaged Soils??

BACKGROUND AND OBJECTIVES

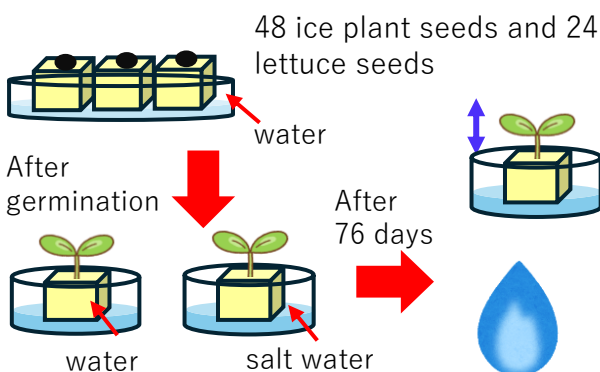


HYPOTHESIS

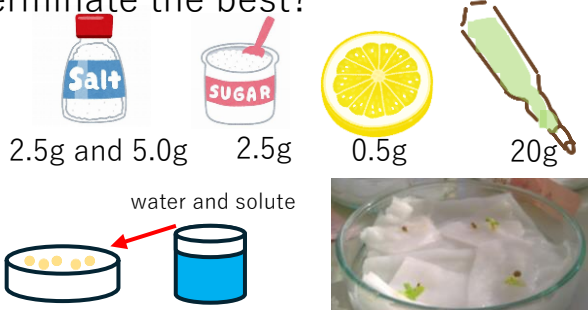
- 1.Planting ice plants will lower the concentration of salt in the soil .
- 2.The germination rate of ice plants will rise if there is salt in the soil.

METHODS

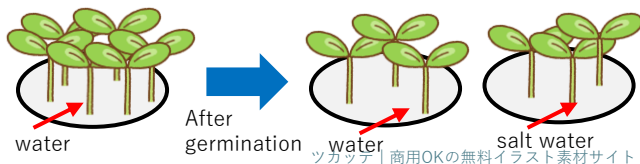
1 Do ice plants change the concentration of salt as they grow?



2 In what kind of water do ice plants germinate the best?



3 After germination, do ice plants grow better with fresh water or salt water?

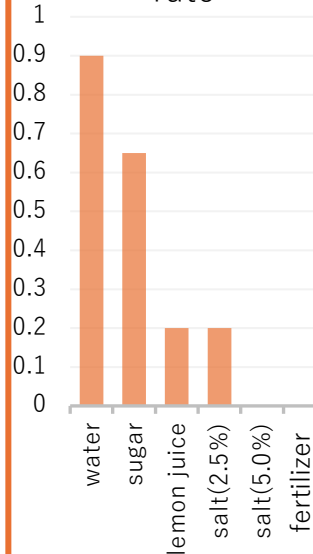


RESULTS

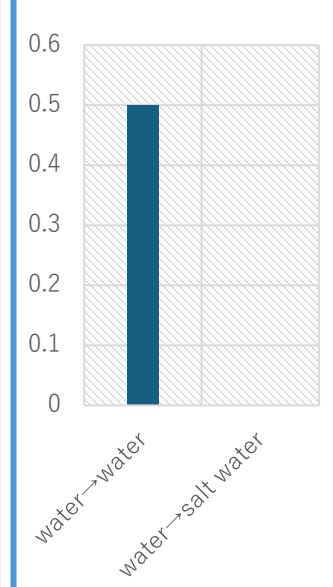
1

Salt deposition(g)	sample 1	sample 2	sample 3
Grew	0.2	0.1	-0.1
Didn't grow	0.2	0.2	

2 germination rate



3 survival rate



DISCUSSION

From 1, ice plants are resistant to salts. We couldn't find if ice plants can absorb salts or not.

From 2, it is better to germinate ice plants to use water than other solutions.

From 3, it is better to grow ice plants in fresh water after germination. Salt has a bad effect on seeds and shoots of ice plants.

PROSPECTS FOR THE FUTURE

In these experiments, the germination rate of ice plants was very low. Generally, ice plants grow in the soil, so we want to research the change in the soil caused by ice plants.

REFERENCES

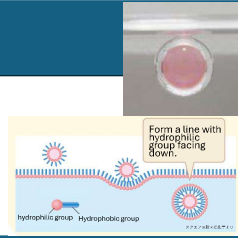
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The best condition for making soap bubbles in the water

Chemistry2-2

1.Objective

We researched the best condition of making soap bubbles in the water. Especially, from the perspective of fallen height, straw thickness, and concentration.

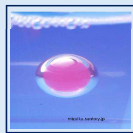
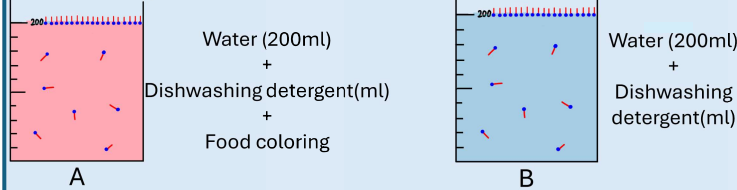


2.Hypothesis

< Fallen height > < Straw thickness > < Concentration >
 • too high→X • thick→○ • low concentration→X
 • too low→X • thin→X • high concentration→○

3.Methods

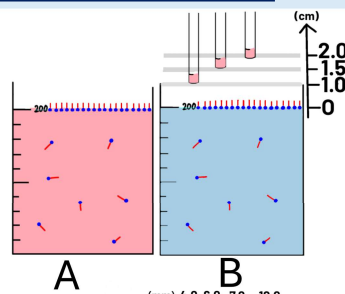
Basic operation



← (how to judge; the soap bubble sinks more than 2 seconds = succeeded)

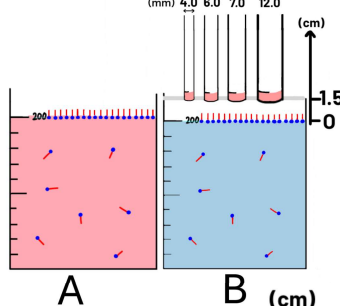
Experiment 1

< Fallen height >
 Change the fallen height
 ①1.0cm ②1.5cm ③2.0cm
 And repeat it 30 times each.



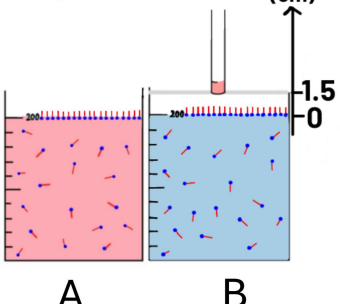
Experiment 2

< Straw thickness >
 Prepare straws whose thickness is
 4mm、6mm、7mm、12mm.
 And repeat it 30 times each.



Experiment 3

< Concentration >
 Change the amount of dissolved dishwashing detergent to
 0.10mL 0.24mL 0.32mL 0.40mL
 0.45mL 0.48mL 0.50mL 0.55mL
 0.56mL 0.60mL 0.70mL 0.95mL
 (against 200ml of water)
 And repeat it 30 times each.



4.Results



Experiment 1

< Fallen height >

Height (cm)	1	1.5	2
○ (times)	1	21	10

It succeeded the most when fallen height was 1.5cm.

Experiment 2

< Straw thickness >

Thickness (mm)	4	6	7	12
○ (times)	0	17	17	0

It succeeded the most when the straw thickness was 6mm & 7mm.

Experiment 3

< Concentration >

Detergent(ml)	0.1	0.24	0.32	0.4	0.45	0.48
○ (times)	13.5	15	16	17.5	13.5	15
Detergent(ml)	0.5	0.55	0.56	0.6	0.7	0.95
○ (times)	22	15	20	18	14	5

It succeeded the most when the amount of dissolved dishwashing detergent was 0.5ml against 200ml of water.

5.Discussion

The best fallen height was **1.5cm**

1.0cm: the impact was too small→the drop couldn't get under water

2.0cm: the impact was too big → soap bubbles got broken

The best straw thickness was **6mm and 7mm**

thicker: the impact was too big → soap bubbles got broken

thinner: the mass of drop became small → the impact was too small → the drop couldn't get under water

The best concentration was around **0.50 ml**

higher: the force of water surface became greater → the drop couldn't get under water

6.Prospects

1. This time, we dropped liquid by hand, so there seems to have some error. Next time, we want to conduct experiments with burette.
2. In our way of measuring the amount of liquid, we couldn't unify the mass. We should decide how much liquid to drop from the perspective of mass.

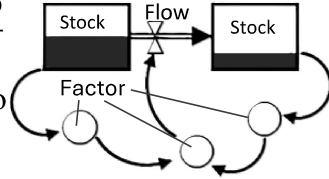
Management of sporting events

Introduction

In this study, I focused on the management of sports events, with the objective of investigating the relationship between ticket prices and revenue. Using Insight maker, a system dynamics software, I created a simulation model of an actual sports event and simulated under various conditions.

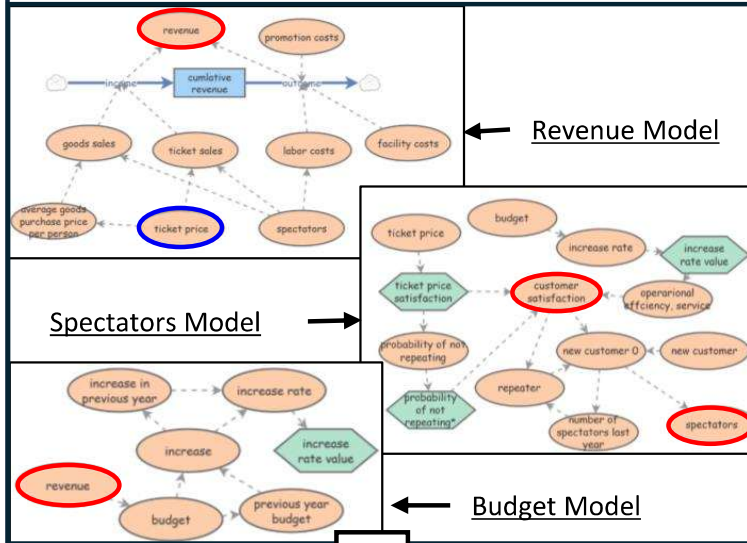
What is System dynamics?

It is a simulation method that tracks how variables subject to prediction changes over time.

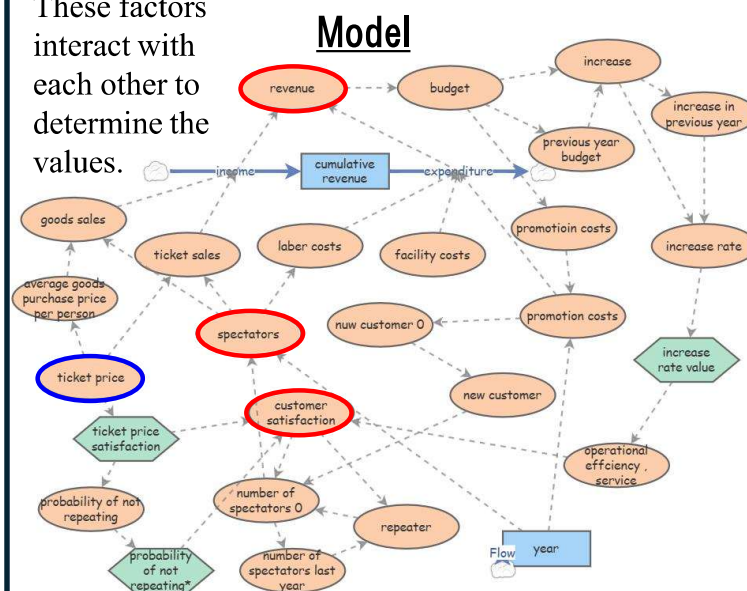


Model Creation

Build models for revenue, spectators, and budget, and combine them into one model.



These factors interact with each other to determine the values.



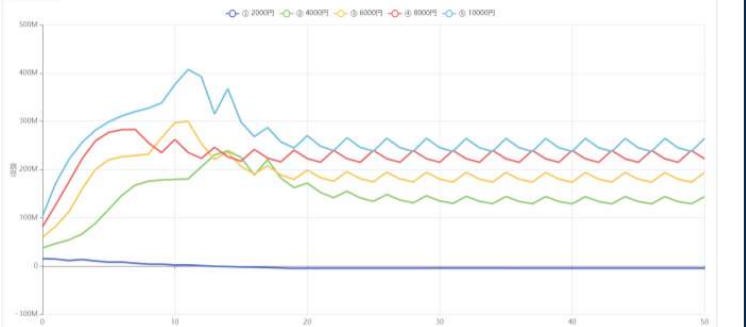
Experiment and Result

Change ticket price.

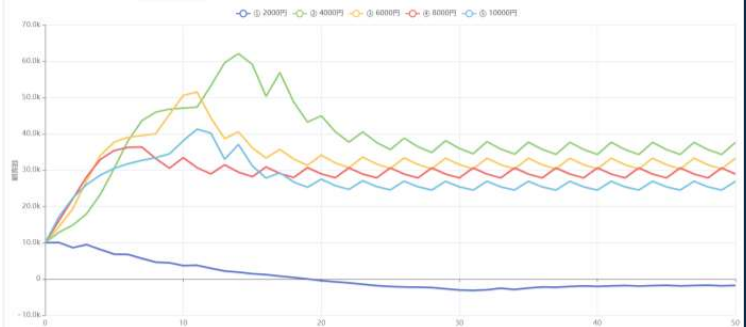
Find out how revenue, number of spectators, customer satisfaction change as ticket price

① 2000円 ② 4000円 ③ 6000円 ④ 8000円 ⑤ 10000円

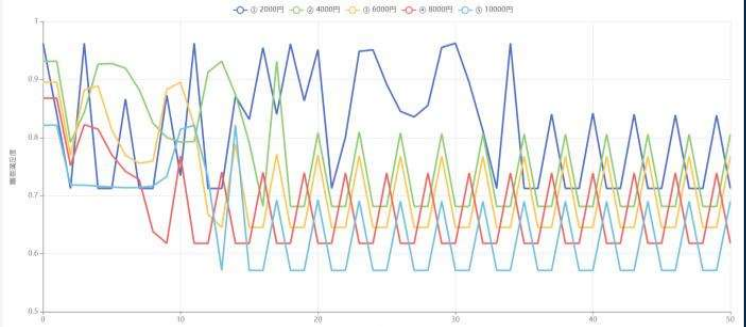
<Figure 1> Revenue



<Figure 2> Spectators



<Figure 3> Customer satisfaction



Consideration

The higher the ticket price, the greater the revenue. However, the number of spectators and the customer satisfaction did not increase as the ticket price increased. So, I consider that there is an appropriate ticket price that strikes a good balance between revenue, spectators, and satisfaction. I want to find an appropriate ticket price by using System dynamics.

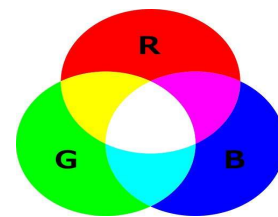
Let's make "Magic chalk" and mix colors!!

Introduction

"Magic Chalk" -looks white but appears red, blue, and green, when drawn on a blackboard with it. We tried to create "Magic Chalk" and mix silica particles to create various colors of chalk.

Hypothesis

The proportion of three types of silica particles mixed will decide the color of chalk identified

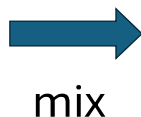
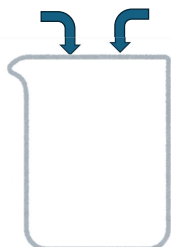


Methods

① 【one-color chalk】 red(200 nm)、blue(251 nm)、green(301 nm)

Laundry starch

Silica particles



Form & dry

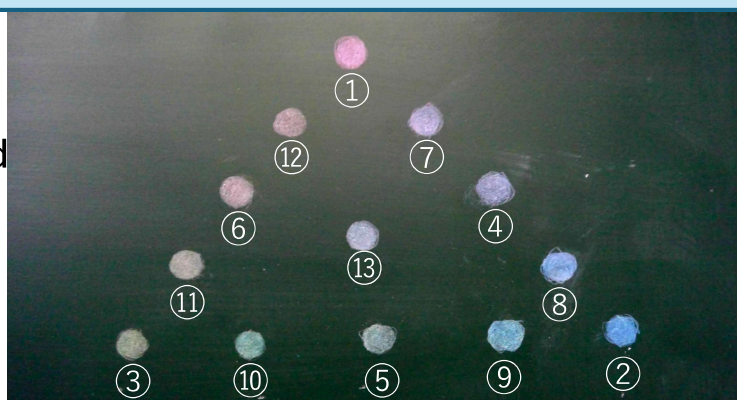


② 【Mix colors】 mix red(200 nm),blue(251 nm),and green(301 nm) in various ratios

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬
Red(200nm)	1			1		1	2	1			2	1	1
Blue(251nm)		1		1	1		1	2	2	1			1
Green(301nm)			1		1	1			1	2	1	2	1

Results

- Red and Blue appeared clearly. But Green looked like yellow green.
- The colors of Green and Red mixed and Green and Blue mixed did not appear as the one in the hypothetical figure.
- We could change the color of chalk by changing the mixing ratio.



Discussion

- We used a green-colored blackboard instead of a pure black one. So, the result color assimilated with the background and the green color didn't show up well.
- We found out the color of chalk can be controlled by mixing silica particles.

Future Prospects

We checked the color only with our own eyes, but by using numerical values to determine the color, we can create some more different colors of chalk.

Silica particles were provided by Fujikagaku Corporation

Equipment pursuing g with Arduino

Background and objective

When we measured gravitational acceleration before, there was a large deviation, owing to hand measuring. So, We've decided to develop a measuring equipment with Arduino so that we could eliminate a deviation by human.

Hypothesis

Using Arduino, we would measure required time without a deviation made by human. Thus, we could get gravitational acceleration; 9.797 m/s^2 (Rikanenpyo · Nagoya) at 4 significant figures.

Methods

How to calculate g

Drop a small metal ball through a vacuum pipe (length is L) and measure the falling time t .

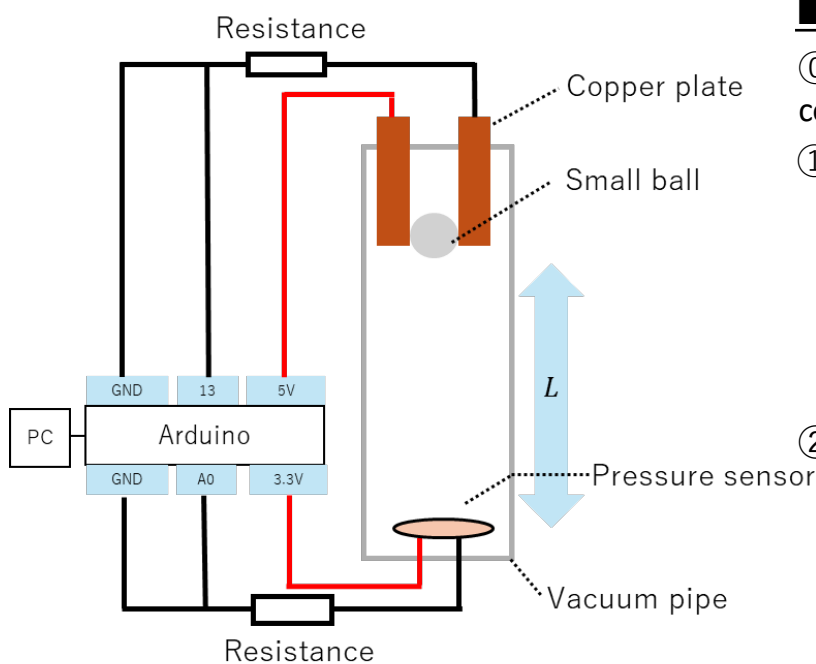
Using this free fall formula ; $L = \frac{1}{2}gt^2$

Thus, g follows the formula below.

$$g = \frac{2L}{t^2}$$

How to measure t

- ① Fasten the small ball between two copper plates.
- ① **START**
 1. Drop the small ball from between two copper plates.
 2. Current stops flowing in the circuit upper side on the left schematic.
 3. Arduino detects this change and start the measurement.
- ② **END**
 1. the small ball land on the pressure sensor.
 2. The resistance decrease rapidly. Arduino detects this, stop measurement.



Result

	value	unit		value	unit
n	36	times	ΔL	0.00001	m
L	0.8940	m	Δt	0.002	s
\bar{t}	0.439675	s	Δg	0.07	m/s^2

From these data, we got the gravitational acceleration below.

$$g = 9.81 \pm 0.07 \text{ m/s}^2$$

Consideration

Why could we get g at 3 significant figures?

- Get rid of as much deviation as possible from gauged time.
- Reduce the effect of air resistance by using a vacuum pipe.

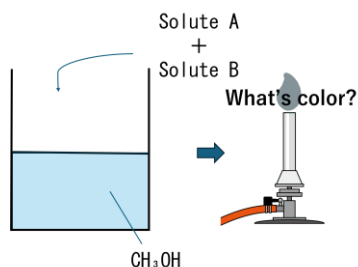
How can we improve this experiment?

- decrease friction between a copper plate and the small ball when we drop the small ball.
- Maintain vacuum state at all times when dropping the small ball.

Let's make pink flame!

Background&purpose

We learn more about flame reaction by making flame color which can't make with a metal ion. (To make white flame, and then make pink flame)

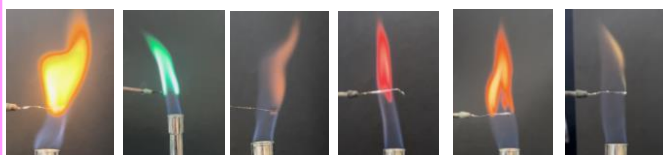


Hypothesis

- ① Depending on each solute, the flame reaction can be observed or not.
- ② When we mix more metal, the flame color will become white.

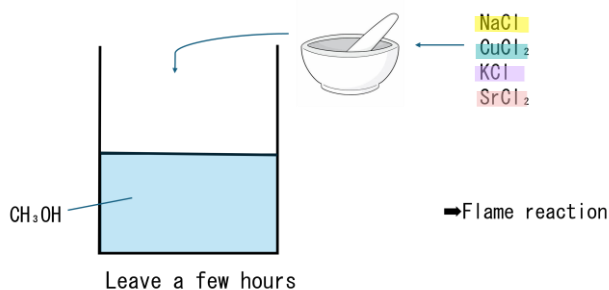
Method

(Validation test of the flame reaction)

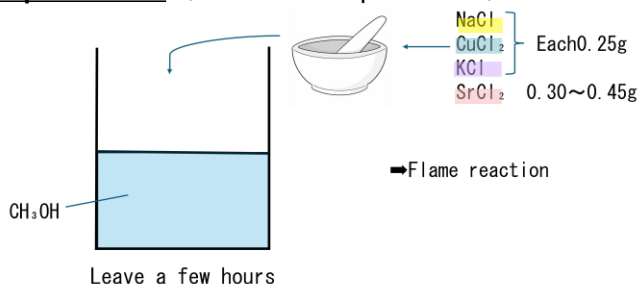


NaCl YL CuCl₂ GR KCl PR SrCl₂ RD CaCl₂ OR Ba(NO₃)₂ KQ

Experiment I <How to make white flame>



Experiment II <How to make pink flame>

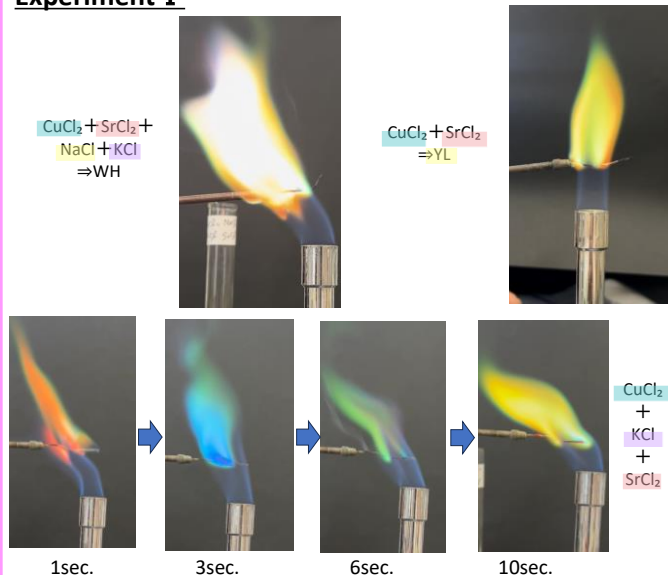


Cited document

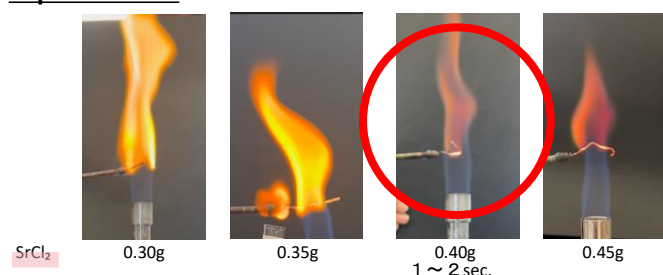
Hiroshi Sakurai/supervision 化学大図鑑
https://www.jstage.jst.go.jp/article/kakyoshi/63/7/63_KJ00010095874/pdf/-char/ja

Results

Experiment I



Experiment II



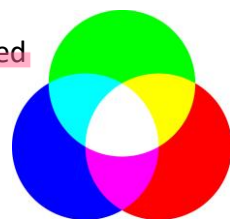
Consideration

Experiment I

- YL+GN+PR+RD → WH ※temporary
- GN+YL → KQ } Additive color mixing
- GN+RD → YL }
- GN+PR → PD } NOT additive color mixing
- YL+PR → OR }

Experiment II

whitish yellow → pink → raddish red
 ⇒ Balance of white color flame is crushed by added SrCl₂
 ⇒ Additive color mixing



Conclusion

Taking these problems into account, we want to continue our study.

- Difference of solubility
- Difference in the onset time of flame reaction
- Difference in ion concentration