



# HEAT PACK REVOLUTION

Hirano Senior High School attached to Osaka Kyoiku University

## ~Fireworks Production Using Heat Pack~

### Introduction

Disposable heat packs can be repurposed, but not many people actually do.  
We'd like to propose a new way to reuse them.

### Hypothesis

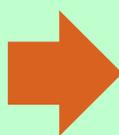
We can make handheld fireworks from the contents of used heat packs.

## Experiments and Results

※: heat pack materials

### 1. reducing HP ※

tried to reduce iron oxide in a HP to iron  
(1) used a microwave oven (reference①)  
(2) used a gas burner

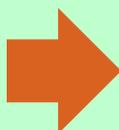


(1) reacted, but dangerous  
(2) succeeded, but it was difficult to separate other substances

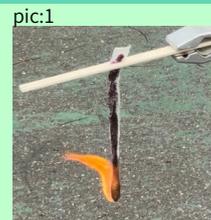
**failed**

### 2. making fireworks without reduction

started making fireworks without reducing HP  
• combined fabric, a small amount of used HP, and lip balm as glue



saw sparks, but burned too much



### ○visiting a fireworks factory

visited KOYAMA HANABI Co. in October • received advice and materials for fireworks

### 3. remaking fireworks

made 8 kinds of fireworks

- oxidizer
- (a) HP
- (b)  $\text{KClO}_4$
- (c)  $\text{KNO}_3$  (HP  $\times 1.5$ )
- (d)  $\text{KNO}_3$  (HP  $\times 2$ )

- wrapping paper
- (1) washi
- (2) tissue paper

→ (b.1) worked well

pic:2



**succeeded**

table:A

		oxidizing agent (g)			
z		(a)	(b)	(c)	(d)
others(g)	S	0.300	0.300	0.300	0.300
	C	0.400	/	/	/
	KCl	0.200	0.200	0.200	0.200
	Ti	0.300	/	/	/
	HP	2.50	0.700	1.40	1.05
	$\text{KNO}_3$	/	/	1.00	1.00
	$\text{KClO}_4$	/	1.00	/	/

## Conclusions

### Discussions

- heat packs → iron powder, carbon
- wrapping and twisting heat pack  
→ important to keep the fire source stable

### Outlook for the future of research

- create fireworks considering safety

### References and Acknowledgement

① [https://www.jstage.jst.go.jp/article/kakyoshi/52/3/52\\_KJ00007743794/\\_article/-char/ja/](https://www.jstage.jst.go.jp/article/kakyoshi/52/3/52_KJ00007743794/_article/-char/ja/)  
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