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## Overview

- ◆ 2D MEMS Probe Card Manufacturing by Using Laser Bonding Process
- ◆ The Experiment
- ◆ Key Parameters of the Process
- ◆ Summary
- ◆ Acknowledgements

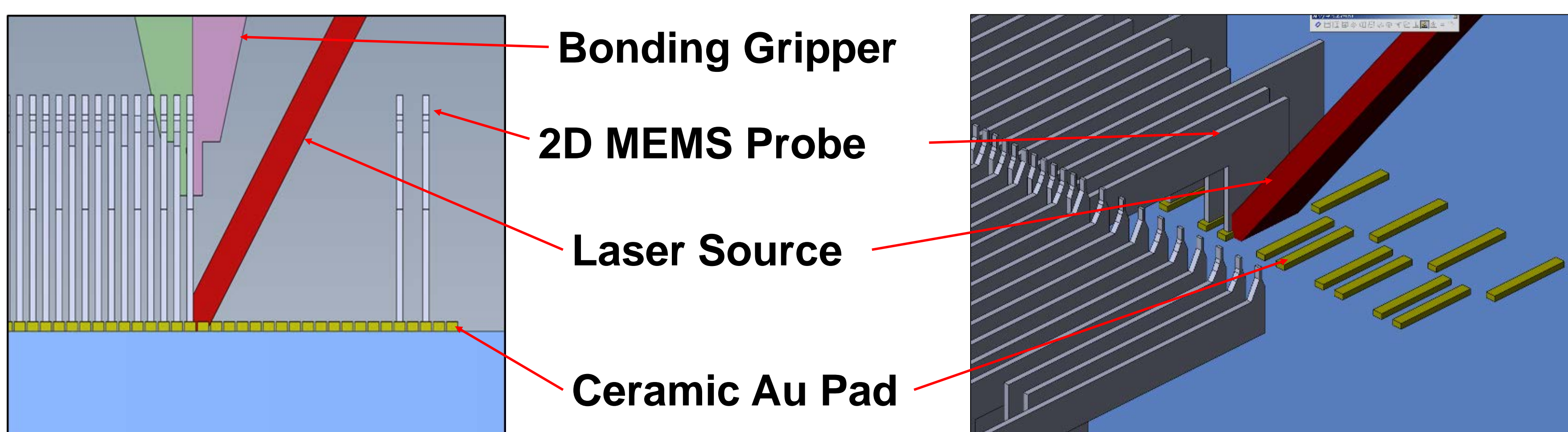
## Laser Micro Bonder

- ◆ Process time : 9.5sec/pin , UPH 300Pin
- ◆ Pin pitch :  $>60\mu\text{m}$  ( Short to Long , Gripper type )
- ◆ Bonding accuracy :  $<\pm 4\mu\text{m}(x,y)$ ,  $<\pm 7\mu\text{m}(z)$
- ◆ Solder paste : SnAgCu , AuSn
- ◆ Card size : 8" , 12"
- ◆ Auto alignment function of probe card



## 2D MEMS Probe Bonding By Laser Process

- ◆ Ceramic Au Pad / Laser Source / Bonding Gripper
- ◆ Solder Paste / Nickel Alloy probe

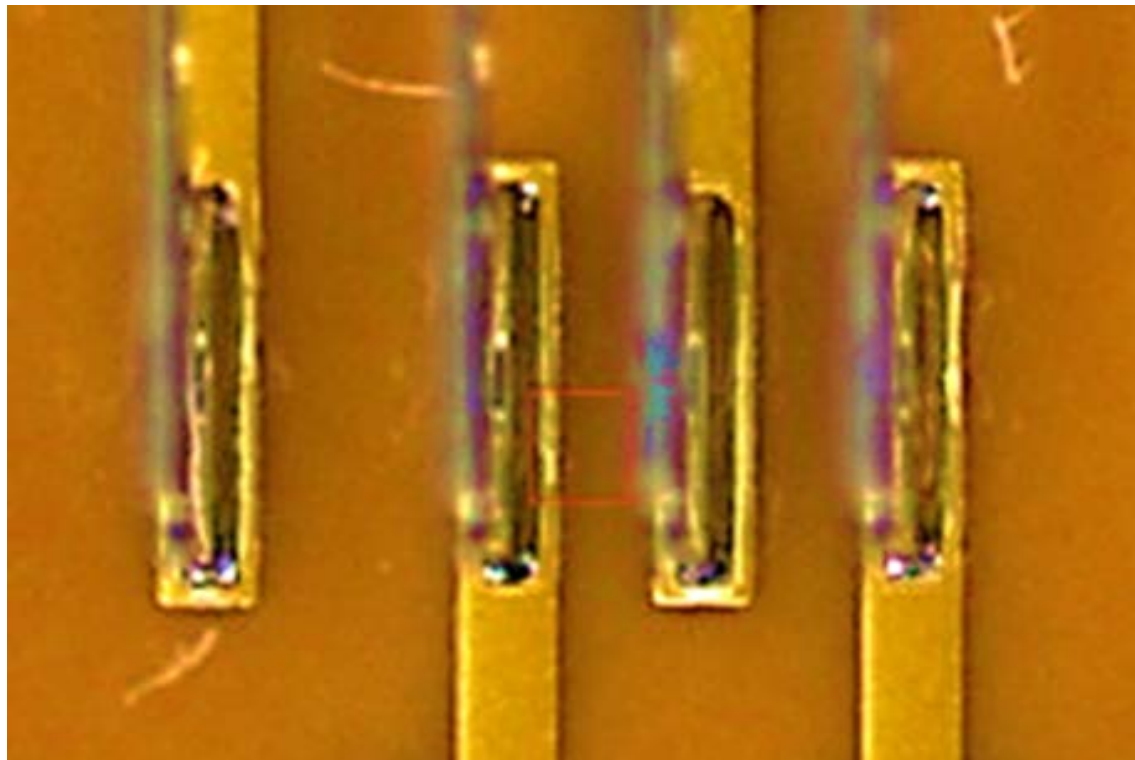




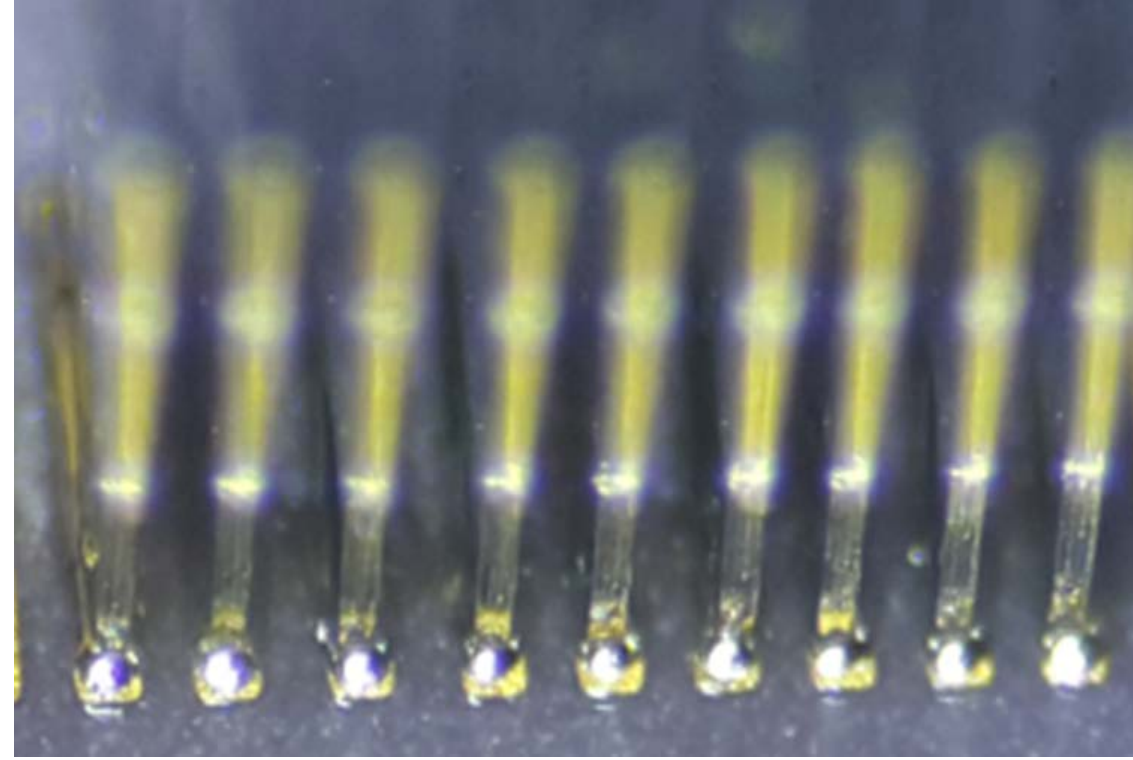
## Ceramic Type

### ◆ Features

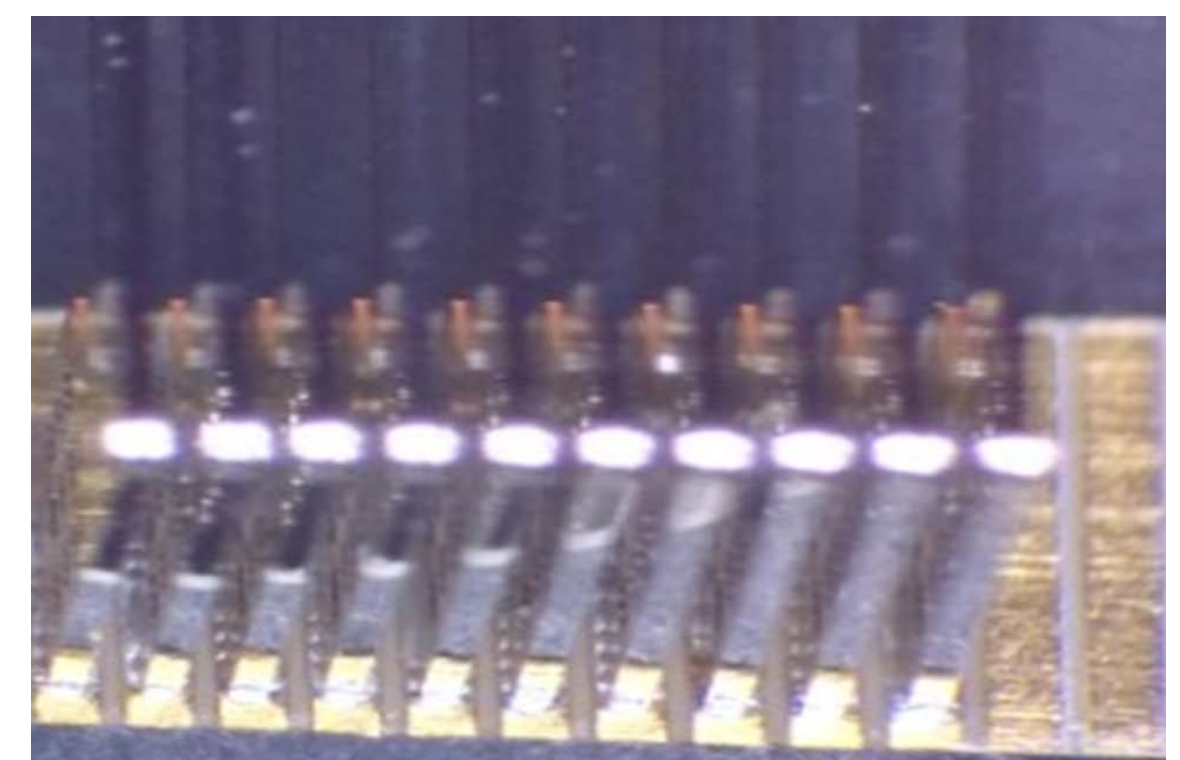
- LTCC ( Low Temperature Co-fired ceramic ) : 1,000 °C (1,830 ° F)
- HTCC ( High Temperature Co-fired ceramic ) : 1,600 °C (2,910 ° F)
- Ceramic PCB : > 1,600 ° C (2,910 ° F)



LTCC



HTCC



Ceramic PCB

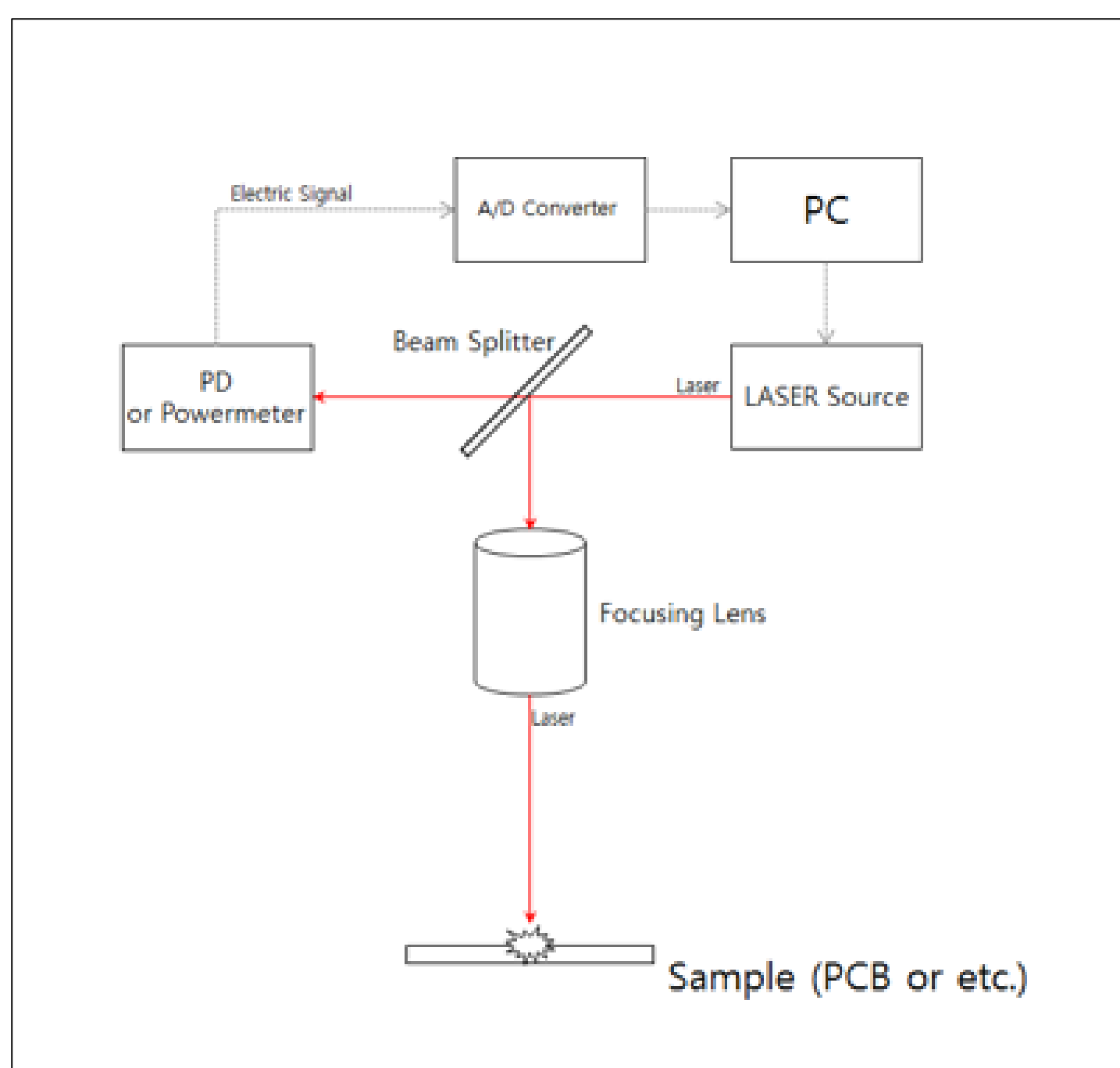
## Solder Type

- ◆ SnAgCu : Sn 3 , Ag 0.5 , Cu 96.5
- ◆ Solder ball type : 4 (20~40µm)
- ◆ Junction Temperature : 217~220 °C

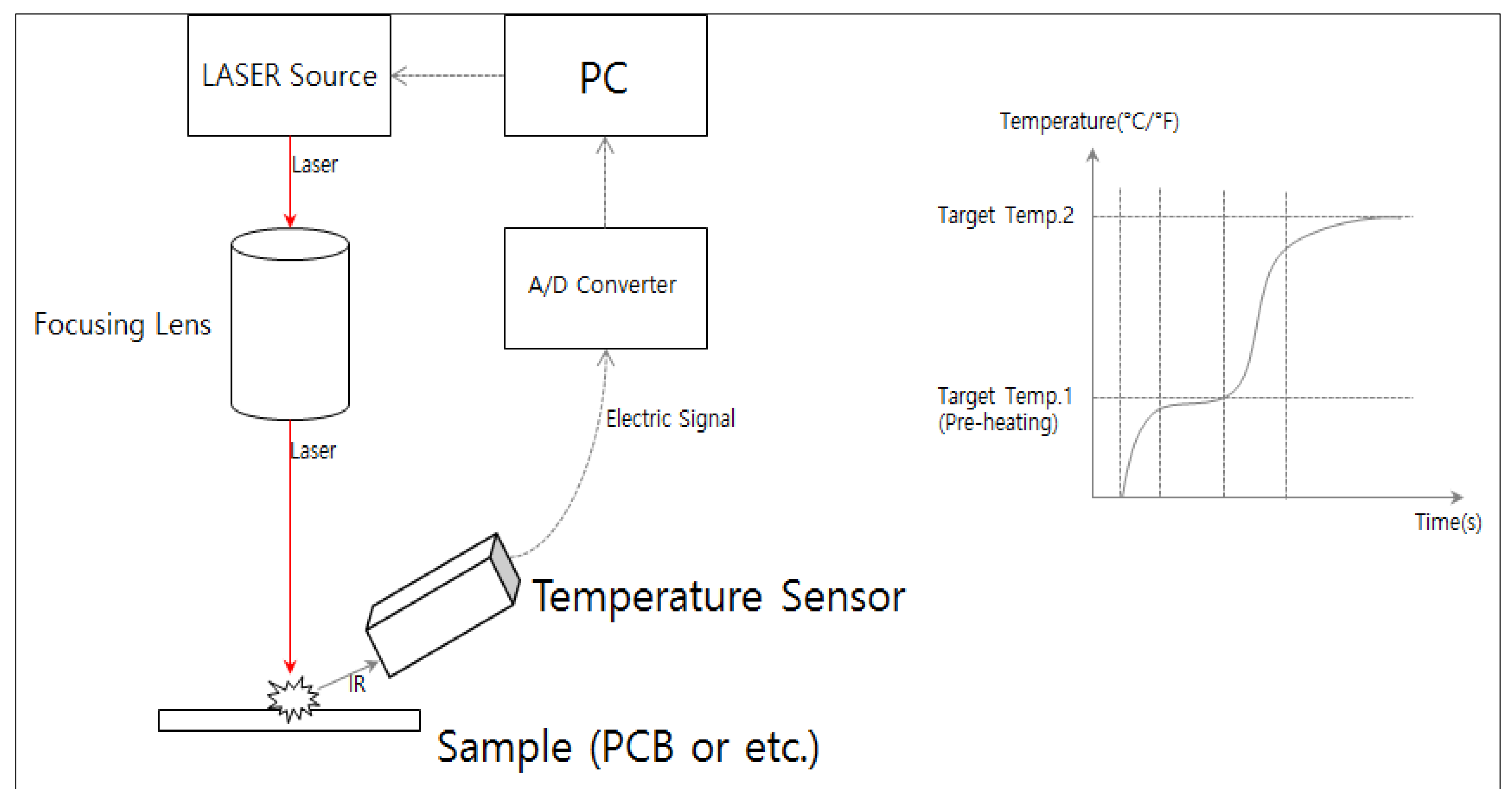
## Laser irradiation time by ceramic type

Ceramic Type	HTCC	LTCC	Ceramic PCB
Laser irradiation time	2.5sec (±0.2)	1.5sec (±0.2)	1.0sec (±0.2)

## Laser power & Temperature measurement



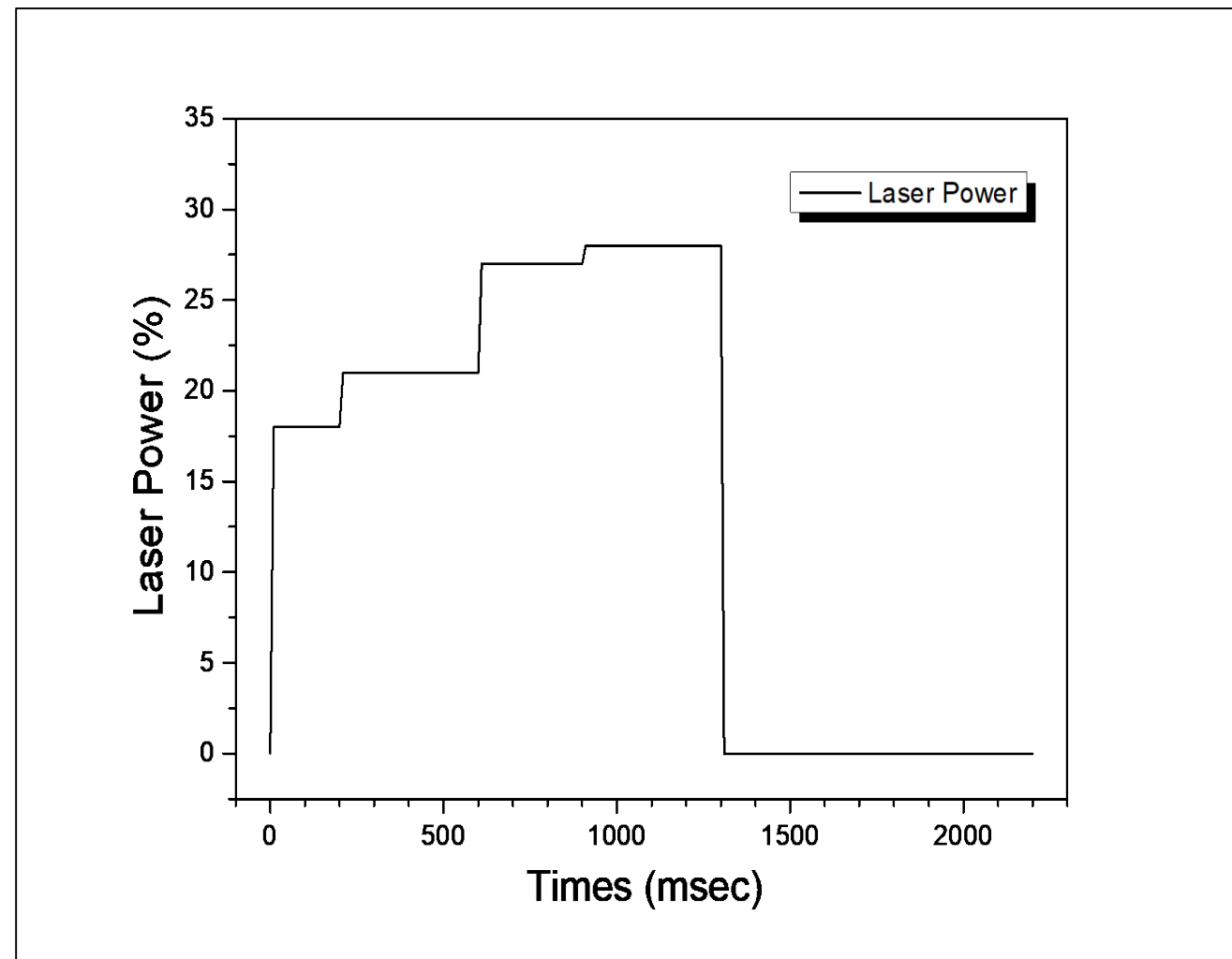
Laser power



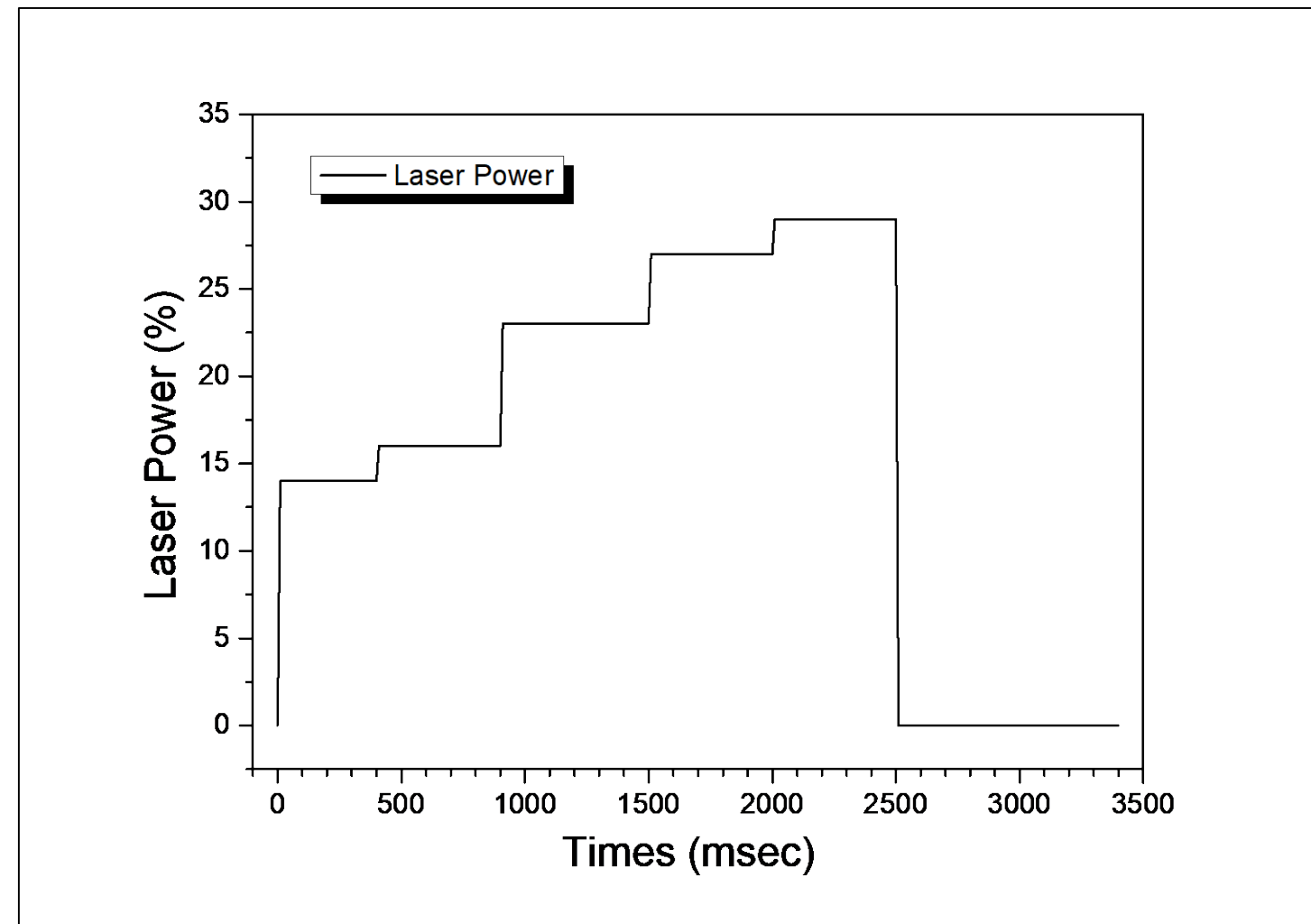
Temperature

## Laser profile

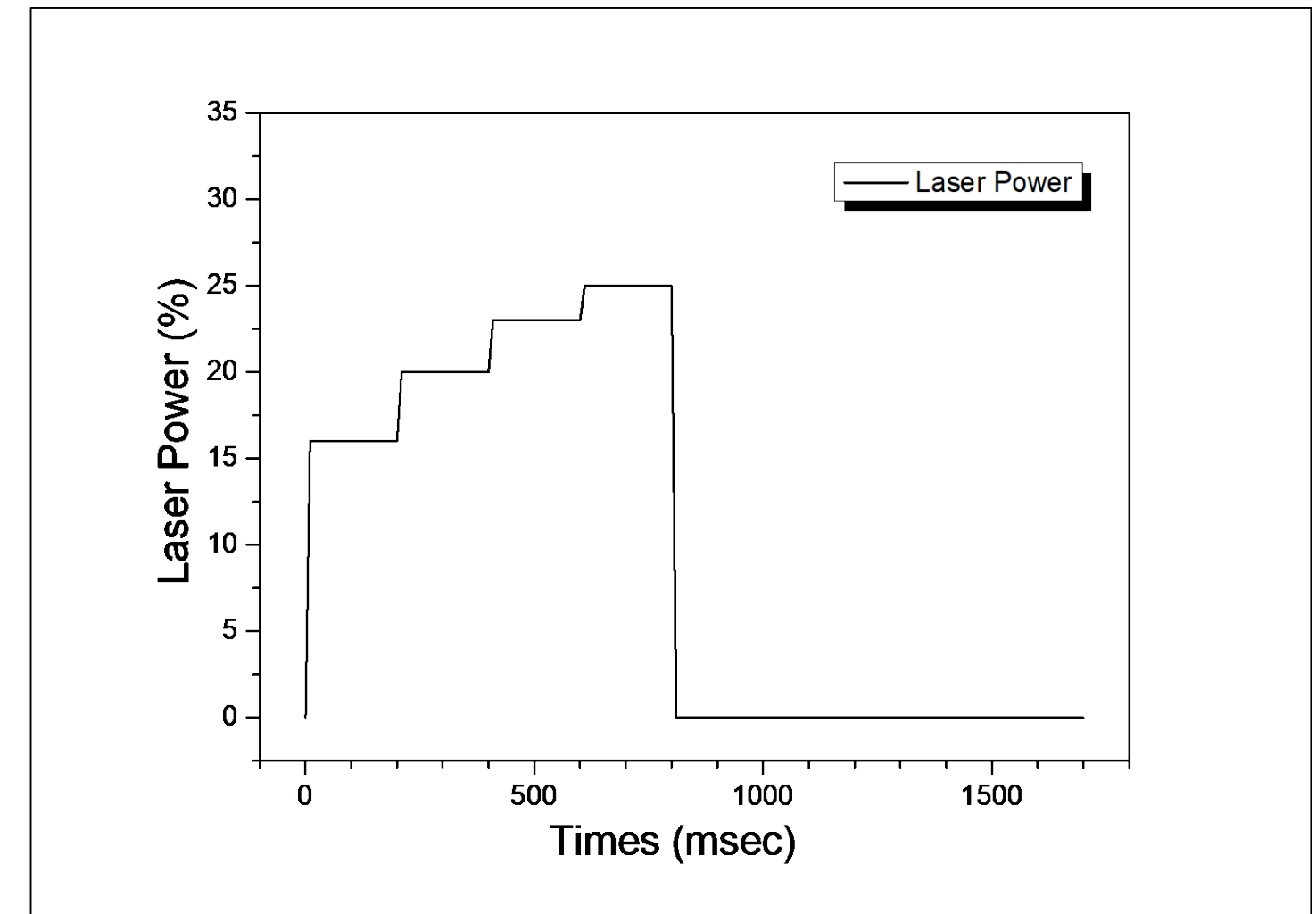
### ◆ Ceramic type



**LTCC**



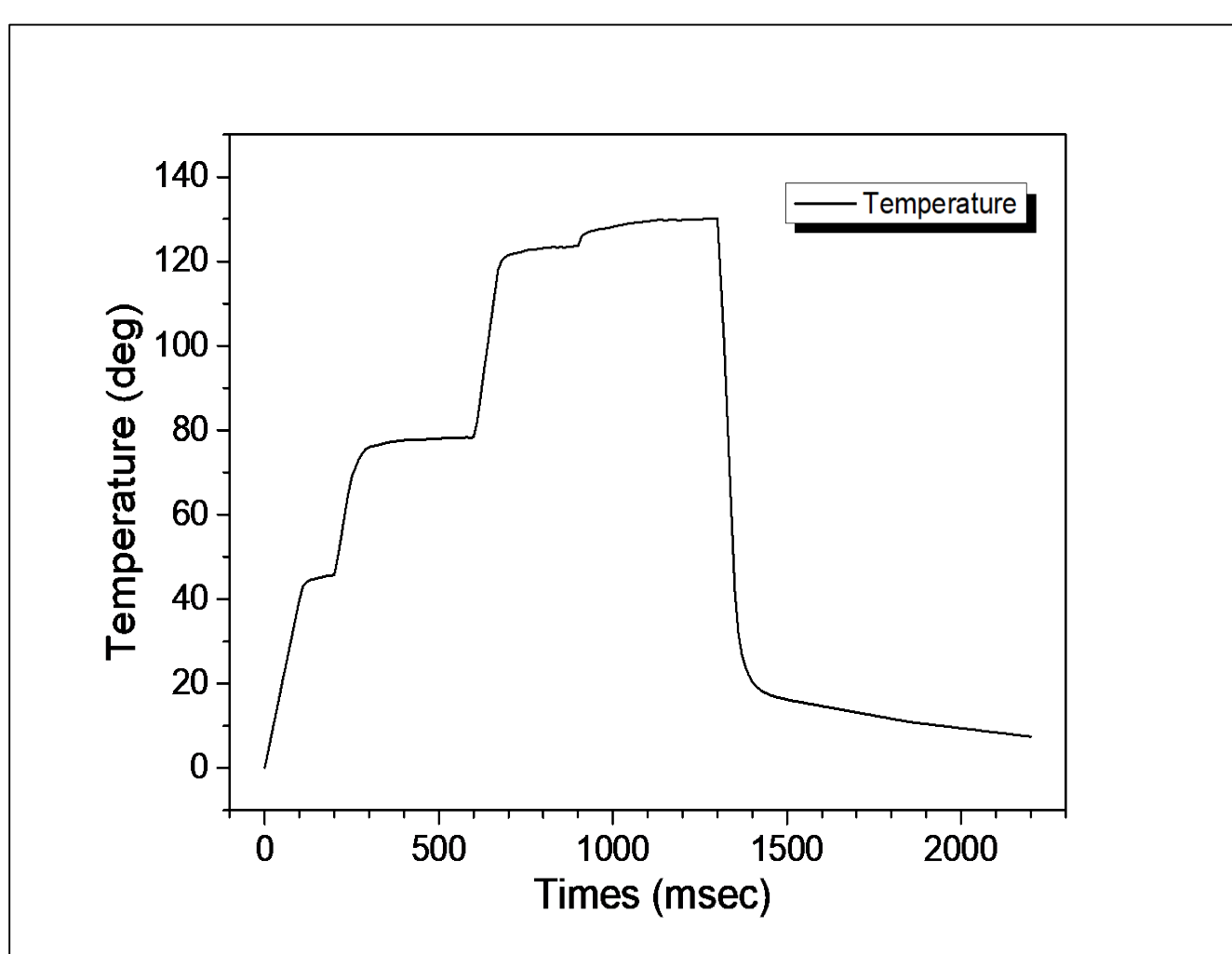
**HTCC**



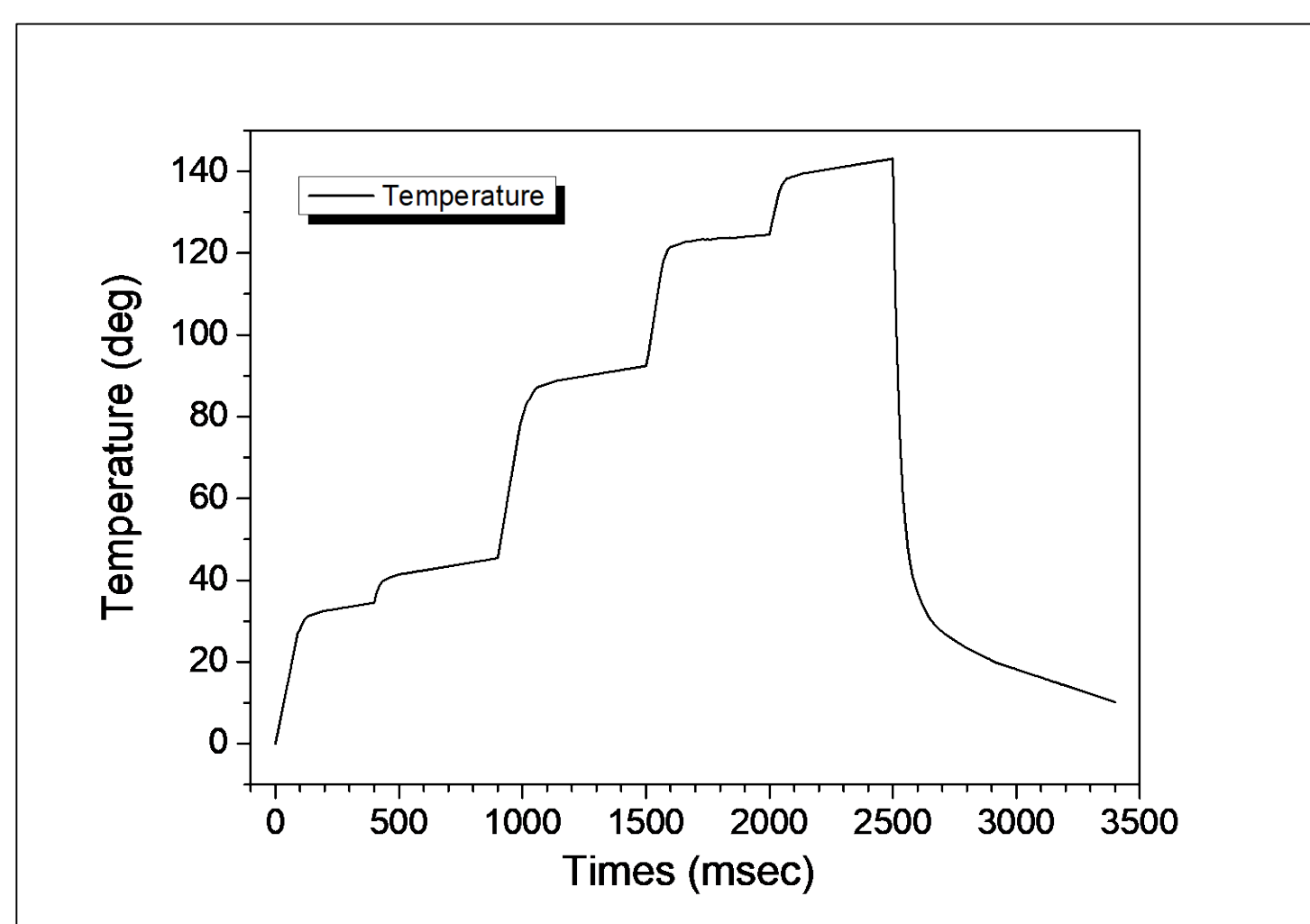
**Ceramic PCB**

## Temperature profile

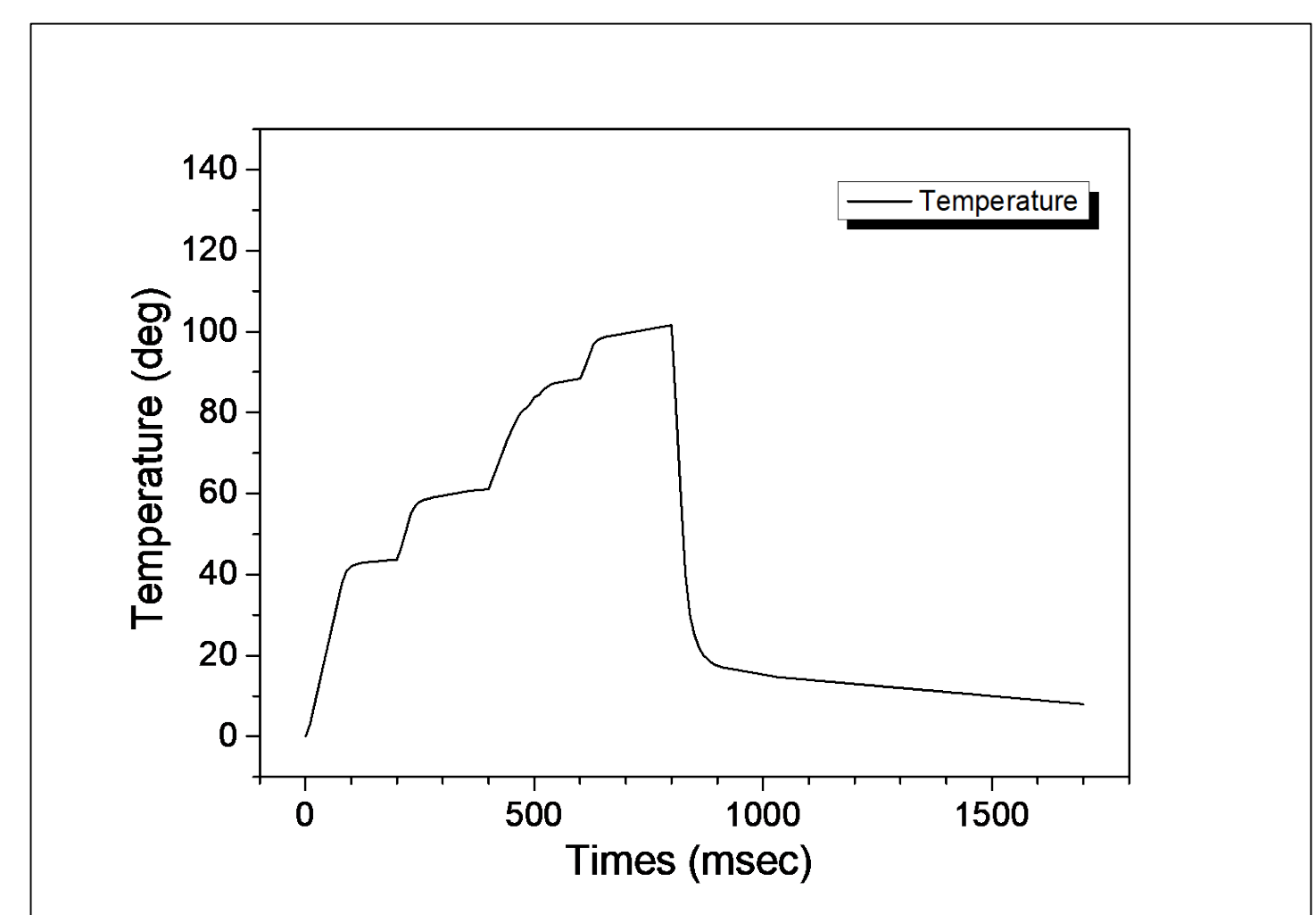
### ◆ Ceramic type



**LTCC**



**HTCC**



**Ceramic PCB**

## Summary

- ◆ Soldering temperature is proportional to ceramic baking temperature.
- ◆ The lower the ceramic firing temperature, the lower the laser power and the irradiation time.
- ◆ We have obtained a reference to laser power and irradiation time through experiment of each ceramic type.

## Acknowledgement

### ◆ Project Funding

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## Thanks for Your Attention

### ◆ Contact Our Team with any questions .

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