

# 光カプラ型2色温度計による制御機構を備えたレーザー微細加工システムの開発

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# 1999 Fiscal Year Final Research Report Summary

## DEVELOPMENT OF LASER PROCESSING SYSTEM WITH TWO COLOR PYROMETER

Research Project

### Project/Area Number

10555246

### Research Category

Grant-in-Aid for Scientific Research (B)

### Allocation Type

Single-year Grants

### Section

展開研究

### Research Field

Material processing/treatments

### Research Institution

Kanazawa University

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### Project Period (FY)

1998 - 1999

### Keywords

LASER PROCESSING / PRECISION MACHINING / TWO-COLOR PYROMETER / FIBER COUPLER / INFRARED RADIATION PYROMETER / BREAKING / LASER FORMING

### Research Abstract

The objective of the present study is to establish a laser machining system for micro machining in a high precision. The temperature of workpiece irradiated with laser is measured accurately using a new type of infrared radiation pyrometer with an optical fiber. The main results obtained in this study are summarized as follows :

1. A basic technique for measuring temperature of workpiece irradiated with laser is established.
2. A technique for controlling crack progress direction in breaking of silicon wafer is established. And by measuring AE signal, we can monitor the crack progress on the wafer.
3. The relationship between the temperature of workpiece irradiated with the deformation angle in forming of stainless plate is determined. Consequently, we can control the deformation by monitoring the temperature.
4. Breaking of micro-diamond grindstone and liquid-crystal glass, and forming of lead frame of semiconductor cell, are become the subjects for future study.

## Research Products (12 results)

All Other  
All Publications

- [Publications] 山田 啓司: "CO<sub>2</sub>レーザーにおける照射部温度と吸収率"精密工学会誌. 65・1. 126-130 (1999) ▼
- [Publications] 大磯 桂一: "シリコンウェハのレーザー切断における照射部温度に関する研究"1999年度精密工学会秋季大会学術講演会講演論文集. 469 (1999) ▼
- [Publications] 及川 志郎: "CO<sub>2</sub>レーザーを用いたフォーミング加工に関する研究(第二巻)"1998年度精密工学会秋季大会学術講演会講演論文集. 135 (1998) ▼
- [Publications] 上田 隆司: "CO<sub>2</sub>レーザーを用いたフォーミング加工に関する研究"1997年度精密工学会秋季大会学術講演会講演論文集. 340 (1997) ▼
- [Publications] Takeshi Ueda: "Temperature of Work Materials Irradiated with CO<sub>2</sub> Laser"Annals of the CIRP. 46. 117-122 (1997) ▼
- [Publications] 上田 隆司: "レーザー照射部のフラッシュ温度測定"精密工学会誌. 61. 278-282 (1995) ▼
- [Publications] KEIJI YAMADA ET AL.: "TEMPERATURE AND ABSORPTIVITY OF WORKPIECE IN CO<sub>2</sub> LASER PROCESSING"JOURNAL OF JSPE. VOL. 65. 126-130 (1999) ▼
- [Publications] KEIICHI OOISO ET AL.: "STUDIES ON BREAKING OF SILICON WAFER IN LASER PROCESSING"PROCEEDINGS OF JSPE, 1999th AUTUMN MEETING. 469 (1999) ▼
- [Publications] SHIRO OIKAWA ET AL.: "STUDIES ON FORMING IN LASER PROCESSING (SECOND REPORT)"PROCEEDINGS OF JSPE, 1998th AUTUMN MEETING. 135 (1998) ▼
- [Publications] TAKASHI UEDA ET AL.: "STUDIES ON FORMING IN LASER PROCESSING (FIRST REPORT)"PROCEEDINGS OF JSPE, 1997th AUTUMN MEETING. 340 (1997) ▼
- [Publications] TAKASHI UEDA ET AL.: "TEMPERATURE OF WORK MATERIALS IRRADIATED WITH CO<sub>2</sub> LASER"ANNALS OF CIRP. VOL. 61. 117-122 (1997) ▼
- [Publications] TAKASHI UEDA ET AL.: "MEASUREMENT OF FLUSH TEMPERATURE OF CERAMICS IRRADIATED WITH CO<sub>2</sub> LASER"JOURNAL OF JSPE. VOL. 61. 278-282 (1995) ▼

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