Title : Comparative Study of Carbon dioxide Plasma for Medical Applications

Author(s) : **1.** Kunasin Sonthi **Student ID :** 650510347

2. **Student ID :**

3. **Student ID :**

Major : Physics

Advisor(s) : **1.** Professor Dr. Dheerawan Boonyawan

2.

3.

Type of presentation* *(choose 1)* **:**

- ☐ **Oral Presentation** (เฉพาะ ตัวแทนนศ.ที่สาขาเลือกให้นำเสนอแบบบรรยาย)
- ☑ **Poster** (กรณี นำเสนอผลงานปัญหาพิเศษ/การค้นคว้าอิสระ)
- ☐ **Cooperative Education** (กรณี นำเสนอผลงานสหกิจศึกษา)

ABSTRACT

This experiment aims to compare the performance of argon–carbon dioxide plasma generated from different plasma generators, namely a plasma jet and arc plasma mobile, in monitoring carbon monoxide production and analyzing the pH variation of plasma-treated solutions. These observations are linked to the mechanisms of carbonic acid formation and oxidizing species within the plasma system. Furthermore, the effects of plasma on material surface properties were investigated, with particular emphasis on changes in wettability, evaluated through contact angle measurements. The results showed that plasma generators exhibited their highest efficiency in carbon monoxide production, as determined by optical emission spectroscopy, which was consistent with pH and contact angle measurements. Optimal operating conditions for the plasma jet were achieved at an argon flow rate of 7 liters per minute with carbon dioxide at 100 cc per minute under a power setting of 3, whereas the arc plasma mobile required an argon flow rate of 4 liters per minute with carbon dioxide at 400 cc per minute. The arc plasma mobile demonstrated higher efficiency in carbon monoxide production and acidification in deionized water compared to the plasma jet. Nevertheless, both plasma generators enhanced the surface energy of glass substrates, with the plasma jet showing superior performance in improving wettability, resulting in greater

**Type of presentation must be matched with an option you choosing on student upload system.*

***The abstract can be more than one page and must be approved by project advisor before upload.*

spreading of water droplets relative to untreated surfaces. These findings indicate that both the type of plasma generators and the flow ratio of argon to carbon dioxide significantly influence chemical processes in solutions and the modification of material surface properties, providing a foundation for the potential medical applications of argon–carbon dioxide plasma.

Keywords: Plasma Jet, Arc Plasma, Wettability, Carbon Monoxide Production, Plasma Medical Applications

**Type of presentation must be matched with an option you choosing on student upload system.*

***The abstract can be more than one page and must be approved by project advisor before upload.*

Title name guide.

ADVISOR title name / แปลไทย	
Professor Dr.	ศาสตราจารย์ ดร.
Professor	ศาสตราจารย์
Associate Professor Dr.	รองศาสตราจารย์ ดร.
Associate Professor	รองศาสตราจารย์
Assistant Professor Dr.	ผู้ช่วยศาสตราจารย์ ดร.
Assistant Professor	ผู้ช่วยศาสตราจารย์
Dr.	ดร.
Lecturer	อาจารย์
Mrs.	นาง
Ms.	นางสาว
Mr.	นาย

Major name guide.

SCIENCE MAJOR name / แปล	
Biology	ชีววิทยา
Microbiology	จุลชีววิทยา
Zoology	สัตววิทยา
Biochemistry and Biochemical Technology *or* Biochemistry and Biochemical Innovation	ชีวเคมีและชีวเคมีเทคโนโลยี *หรือ* ชีวเคมีและชีวเคมีนวัตกรรม
Chemistry	เคมี
Industrial Chemistry	เคมีอุตสาหกรรม
Materials Science	วัสดุศาสตร์
Physics	ฟิสิกส์
Computer Science	วิทยาการคอมพิวเตอร์
Data Science	วิทยาการข้อมูล
Mathematics	คณิตศาสตร์
Statistics	สถิติ

**Type of presentation must be matched with an option you choosing on student upload system.*

***The abstract can be more than one page and must be approved by project advisor before upload.*

Gemology	อัญมณีวิทยา
Geology	ธรณีวิทยา
Environmental Science	วิทยาศาสตร์สิ่งแวดล้อม

**Type of presentation must be matched with an option you choosing on student upload system.*

***The abstract can be more than one page and must be approved by project advisor before upload.*