



Nanomaterial synthesis by microplasma technology

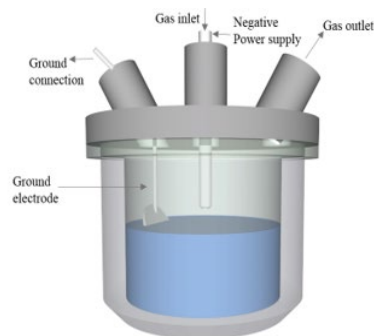
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Introduction

Nanoparticles synthesized by plasma-liquid interactions (PLIs) has received significant attentions in various fields. PLIs provide plasma-liquid interfaces where many physical and chemical processes take place at low temperature and atmospheric pressure. Microplasma, has been defined by having at least one dimension in the sub-millimeter scale, presents great potential in nanomaterial synthesis based on the high electron density in the microplasma region.

Project summary

The motivation of the study is to synthesize different nanomaterials such as carbon quantum dots (CD), Eu doped CeO_2 through a simple, fast and effective microplasma-assisted process. Aqueous chemical solutions are used as precursors for nanoparticle synthesis through different mechanisms under the function of plasma. The adjustable transfer of electrons are able to control the reaction rate of nanoparticles synthesis and have the potential to influence the size and functional groups generation of product by the variation of power input. Afterwards, the synthesized products will be examined by complementary analytical methods, and their emission properties will be studied by photoluminescent spectrometer. In addition, possible mechanisms for plasma-assisted catalyst synthesis will be investigated by correlating optical emission spectroscopic study.



Microplasma reactor



CD solution under UV lamp

Project goals

- Synthesizing N-doped carbon dots with various luminescent properties by the plasma-assisted method. Explore the effect of plasma on the structure and property of synthesized carbon dots.
- Investigation the possibility of scaling up the plasma process

Contact information

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