400-900 nm Light Emitting Silicon Nanoparticles

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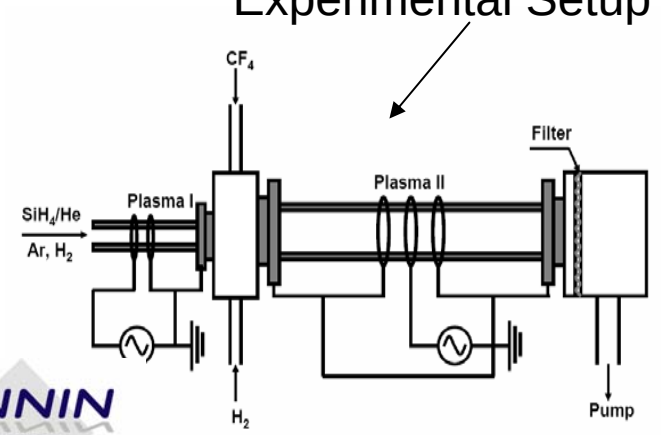
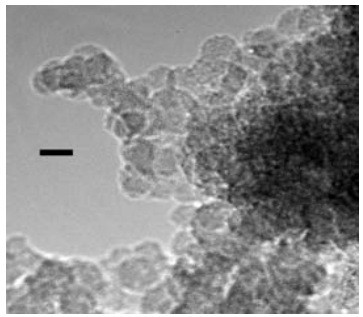
- Project Goals
- To create a in-flight passivation and etch procedure that allows for the creation of Si-NPs which emit in the entire visible light spectrum for use in LEDs, lasers and other devices – within one processing step. No additional ex-situ wet chemistry or in-situ processing is needed!
- System utilizes two CCP RF discharges to create and etch the Si-NPs.

Experimental Setup

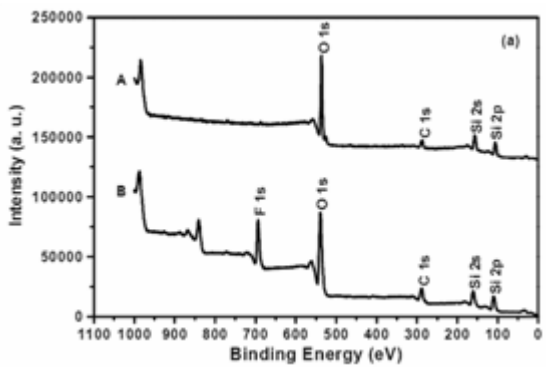


- Accomplishments
  - Can fabricate Si-NPs that emit light in the red, orange, yellow, and green.
  - Fabricated blue light emitting Si-NPs, but the emission may be due to defect states.

TEM of Bare Si-NPs



Light Emitting Si-NPs irradiated by a UV source



XPS Survey Spectra of bare Si-NPs (A) and etched Si-NPs (B) performed in the CHARFAC.

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