



# Plasma Synthesis of Nanocrystals

Technology No. z07107

## Gas-Phase Nanocrystal Synthesis Technologies Available for Licensing

Three cost effective technologies for creating nanocrystals via a gas-plasma, non-aqueous process are available to license. Gas phase production of these nanocrystals is faster, higher yield and more cost efficient than current processes. The technologies can be optioned for a six month trial period for a \$10,000 Try fee to enable testing of the commercial viability of this process to produce nanocrystals for your application.

### MN-IP Try and Buy

#### Try

- \$10,000 for a six month trial
- Trial fee is waived for MN companies or if sponsoring \$50,000+ research with the University
- No US patent costs during trial

#### Buy

- \$40,000 conversion fee (TRY to BUY)
- Royalty rate of 3% (2% for MN company)
- Royalty free for first \$1M in sales

The license includes these two technologies:

## Nanoparticles Functionalized with Organic Molecules

A novel gas phase method and apparatus effectively grafts organic molecules onto silicon nanocrystals to form a passivation layer. The process produces grafted Group IV nanoparticles

quickly, at room temperature and with minimal particle aggregation and diffusional losses. The plasma-treated particles are readily soluble in various nonpolar solvents.

## **High-Yield Plasma Synthesis of Luminescent Silicon Nanocrystals**

A single-step continuous flow non-thermal plasma process produces luminescent silicon nanocrystals. The nanocrystals, which range between 2 and 8 nm, can be produced within milliseconds. The process involves passing an argon-silane ( $\text{SiH}_4$ ) precursor gas mixture through a quartz reactor tube upon which radio-frequency power is applied through copper ring electrodes, generating a radiofrequency (RF) plasma. The nanocrystals created in this unique plasma environment are collected downstream from the plasma and produce consistent, desirable yields, easily scalable through parallelizing.

<https://license.umn.edu/product/plasma-synthesis-of-nanocrystals>