

ABSTRACT**SILICON/GERMANIUM NANOPARTICLE INKS, LASER PYROLYSIS
REACTORS FOR THE SYNTHESIS OF NANOPARTICLES AND ASSOCIATED
METHODS**

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Laser pyrolysis reactor designs and corresponding reactant inlet nozzles are described to provide desirable particle quenching that is particularly suitable for the synthesis of elemental silicon particles. In particular, the nozzles can have a design to encourage nucleation and quenching with inert gas based on a significant flow of inert gas surrounding the reactant precursor flow and with a large inert entrainment flow effectively surrounding the reactant precursor and quench gas flows. Improved silicon nanoparticle inks are described that has silicon nanoparticles without any surface modification with organic compounds. The silicon ink properties can be engineered for particular printing applications, such as inkjet printing, gravure printing or screen printing. Appropriate processing methods are described to provide flexibility for ink designs without surface modifying the silicon nanoparticles.

Figure accompanying abstract: Figure 20



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