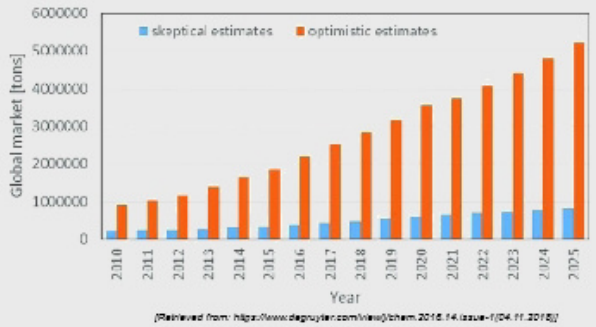
Scaling up of Ultrasonic Spray Pyrolysis for Nanoparticle Synthesis

G. Alkan[1], B. Friedrich[1]
[1]IME Process Metallurgy and Metal Recycling - RWTH Aachen University, Intzestraße 3 - 52056 Aachen

Motivation



(Retrieved from: https://www.degruyter.com/view/j/chem.2016.14.issue-1/(04.11.2015))

- Wide application areas; increasing world wide demand
- The need for mass production, conserving microstructural and functional properties

Ultrasonic Spray Pyrolysis: Key reaction parameters

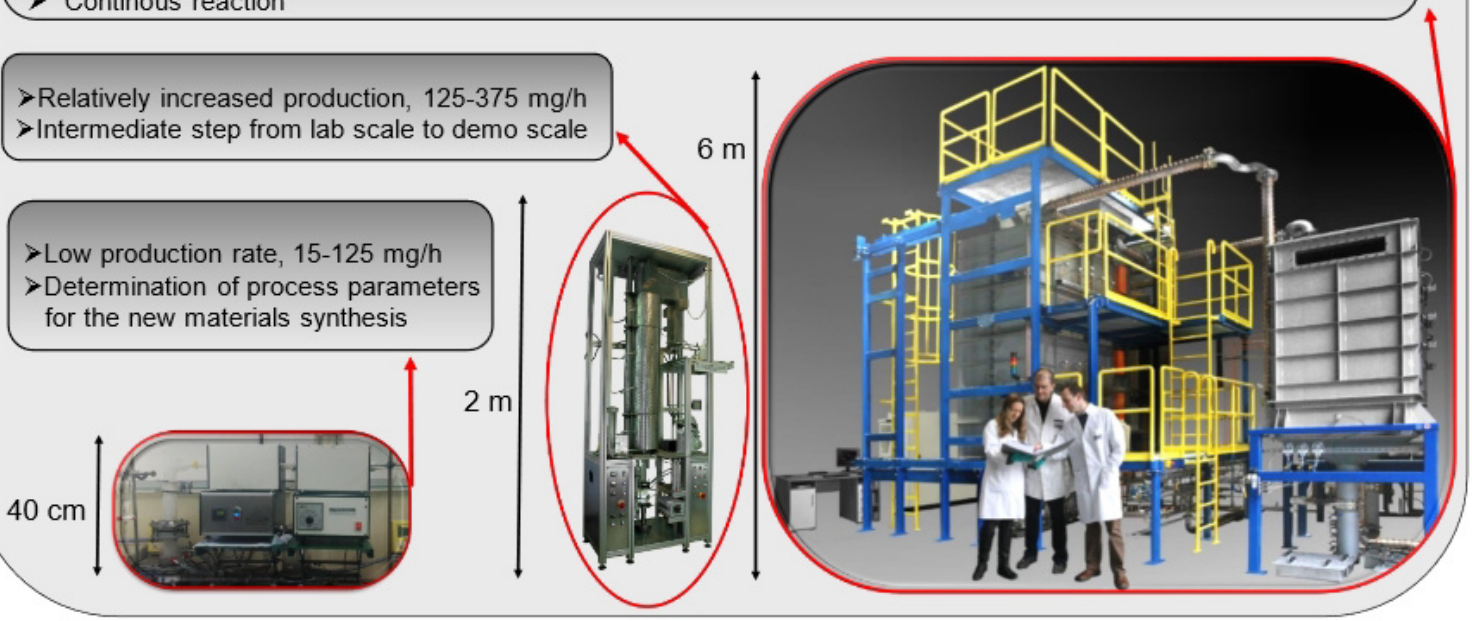
- Ultrasound frequency and precursor solution determine the droplet size
- Droplet size, reaction temperature and gas flow rate determine the nanoparticle size and morphology

Lab Scale to Demo Scale

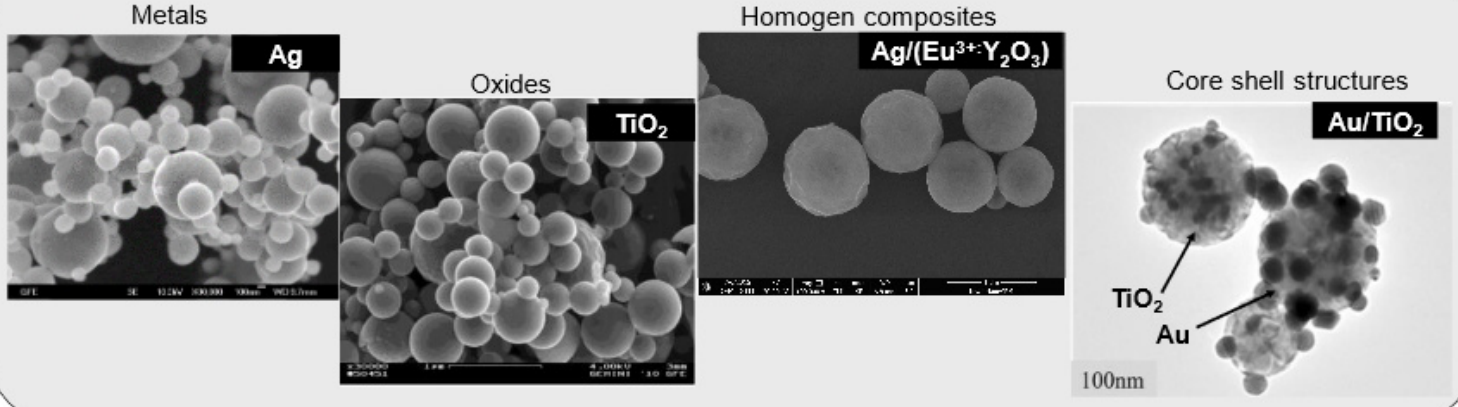
- Five ultrasound generators (2.5 MHz) which are regulated automatically and allow running a continuous process.
- A gas system with controlled volume mass flow of pure and mixed gases allows to carry aerosols to heating zones.
- Each aerosol generator is connected to an individual reaction tube.
- Five reaction tubes located in a wall heated furnace with separately regulated four heating zones (max. 1000 °C).
- The stream containing carrier gas and nanoparticles are carried to the powder collection area,
- Continous reaction

- Relatively increased production, 125-375 mg/h
- Intermediate step from lab scale to demo scale

- Low production rate, 15-125 mg/h
- Determination of process parameters for the new materials synthesis



Material Flexibility



Contact person: M.Sc. Gözde Alkan
E-Mail: galkan@ime-aachen.de

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