

Meeting Industry's Needs

Recent MPLUS nanomanufacturing projects address a priority need identified by industry for accelerating commercialization of nanotechnologies:

- Real-time, on-process monitoring of nanoscale materials in gas-phase synthesis processes



On-Site Demonstration: Luna NanoWorks, Danville, VA

Performance testing on production process for Trimetaspheres™.

Measurements in reactor, in safety hood, operation room, and process stream from separation unit.

Gained greater understanding of process and monitoring needs.

Innovation: ORNL staff modified commercial instrumentation and software to meet unique sampling and characterization needs.

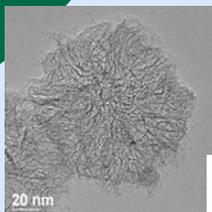


Laboratory Testing at ORNL with Materials Technology Institute

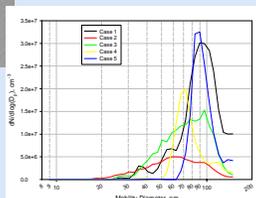
A multidisciplinary team demonstrated the capability of a differential mobility analyzer for real-time characterization of nanoparticles on two industrially relevant processes.



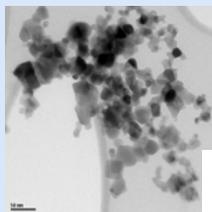
Carbon nanohorns by laser ablation



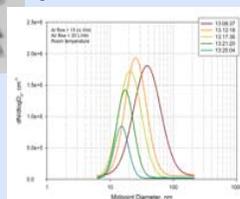
Determined variation of size distribution with different laser power parameters



Titanium dioxide by chemical vapor deposition



Detected variation of particle size with transients in processes



Results indicate the value of real-time characterization for process development and process monitoring and control.



Success in these efforts indicates value in continued industry/national lab collaboration on research and development into advanced, responsible nanomanufacturing:

- Effective monitoring of processes and workplace
- Process development for efficiency improvement, quality control, waste reduction, and reduced emissions

Commercially available equipment for detailed characterization of aerosols is portable and adaptable for in-plant use for nanomanufacturing