

The Laboratory's research activities fall into the following areas:

- Soot filters for diesel particulate emission control
- Gaseous emission control technologies (HC, CO oxidation, NO_x reduction)
- Filter and membrane systems for hot-gas clean up
- Catalytic nanoparticle synthesis by aerosol/combustion/wet chemistry-based routes
- Spatially controlled coating and functionalization of porous materials
- Multifunctional compact monolithic reactors
- Solar thermal volumetric receivers for future power plants
- Monolithic solar water splitting reactors for hydrogen production
- Solar-assisted hydrocarbon reforming for hydrogen/carbon nanoparticle production
- Material technologies for multi-fuel processors
- Controlled nanoparticle generation, separation and measurement
- Evaluation of size-specific biological effects of nanoparticles
- Optical and laser diagnostics for particle measurement
- Nanoparticle and gas sensors for on-board monitoring and control
- Multi-sample testing units for fast screening of emission control devices
- Discrete particle simulation (Monte Carlo, lattice Boltzmann, cellular automata and discrete element methods)
- Computational fluid dynamics of entire engine exhaust systems
- Simulation of fouling and slagging phenomena in solid fuel combustion
- Simulation of aerosol reactors (multivariate population dynamics)