



ISTITUTO MOTORI

Consiglio Nazionale delle Ricerche

AVVISO DI SEMINARIO

Martedì 25 novembre 2014, ore 11:30 – 12:30
Istituto Motori - CNR, Aula Barsanti e Matteucci

Prof. Andrea D'Anna

Università degli Studi di Napoli "Federico II"

Combustion Generated Fine Carbonaceous Particles

The processes by which carbonaceous nanoparticles are produced from combustion of liquid and gaseous fuels are reviewed in this talk.

The focus is on the formation and properties of nanoparticles in laboratory laminar, premixed and diffusion flames and on the most popular methods of sampling and detection of these particles. Particle chemical nature is analyzed from data obtained by several measurement techniques. Measurements characterizing nanoparticles in the exhausts of practical combustion systems such as engines and commercial burners are also reported.

A modeling analysis based on detailed chemical kinetic calculations and on a molecular dynamics approach is used to show how the growth of aromatics, the chemical nature of the particles and their morphology depend on temperature and radical concentration distributions encountered in flames.

Two classes of carbonaceous material are mainly formed in combustion: nanoparticles with sizes in the range 2-5 nm, and soot particles, with sizes from 0.01 to 1 micron. Nanoparticles show unique chemical composition and morphology; they maintain molecular characteristics in terms of chemical reactivity, but at the same time exhibit transport and surface related phenomena typical of particles. The emission of these particles contributes to atmospheric pollution and constitutes a serious health concern. On the other side the peculiar features of combustion-generated nanoparticles stimulate the scientific community to use them to produce or engineer new smart nanomaterials.

Info: m.costa@im.cnr.it

