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ΣΕΜΙΝΑΡΙΟ

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ΟΜΙΛΗΤΗΣ: **Georgios F. Kylafis,** PhD

ΘΕΜΑ: **Turbulent explosions of gas/carbon black nanoparticles mixtures: an approach to access the explosion characteristics in dust clouds of dispersed engineered nanoparticles (ENPs)**

ΤΟΠΟΣ: Αίθουσα Σεμιναρίων ITE/IEXMH

ΗΜΕΡΟΜΗΝΙΑ: **Δευτέρα, 19 Ιουνίου 2017**

ΩΡΑ: **16:00**

ΠΕΡΙΛΗΨΗ

Knowledge of the change in the explosion severity of lean flammable gas/air mixtures after the addition of engineered nanoparticles (ENPs) is vital for the completion of risk assessments related to various industry case-studies. Carbon black (CB) ENPs originating from specific nanopowders have been mixed under turbulent conditions with methane to form hybrid mixtures of variable dust concentration. Explosion tests have been performed in a 23 L cylindrical combustion vessel providing the adjustment of isotropic turbulence induced by specially designed fans. Measurements of the explosion pressure history and of the flame speed derived from high speed Schlieren cine photographs were conducted to characterise the explosion severity. The influence of CB ENPs on explosion severity was investigated by comparing the results obtained for pure methane-air explosions. Prior to the explosion tests, measurements of particle size distributions (PSDs) were conducted in the explored dust clouds via a differential mobility spectrometer (DMS). Results indicated that among the

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investigated hybrid mixtures, the mixture of the highest fraction of ultrafine particles (diameter < 100 nm) produced the severest explosion**.** At the same time, the particular mixture was that of the lowest dust concentration. Finally, this work demonstrated that despite the very low content of volatiles in the tested nanopowders, a hybrid mixture can be ignitable at an equivalence ratio (ϕ) well below the lower flammability limit (LFL) of the gas.

ΣΥΝΤΟΜΟ ΒΙΟΓΡΑΦΙΚΟ

I gained a BSc in Civil Engineering from the University of Patras (2006) and a MSc in Environmental Engineering from the Aegean University (2011). I then pursued a PhD in Chemical engineering at the University of Leeds (UK), which I completed in 2016. My research interests cover a range of topics in the broader area of aerosol science and technology, ranging from online and offline size measurement techniques of airborne engineered nanoparticles (ENPs), to the development of aerosol dynamic models for the study of particle interactions in the airborne state. I have also a particular interest in the synthesis of ENPs in the gas phase for applications in nanotechnology. I am a member of the aerosol society since 2014.