Current Status and Future Trends in Nanocarbon added Ceramics

The plenary lecture will give a comprehensive view on innovative developments made in the field of nanocarbons e.g. carbon black, carbon nanotubes, graphene added ceramics highlighting the key issues related to integration technology and improvements in the mechanical, tribological or functional properties as a result. Among non-oxide ceramics the silicon nitride based ceramics are well-known as low density materials with high strength and toughness. Silicon nitride, known as a typical dielectric material, is an ideal candidate for several structural applications, even at high temperatures. The addition of graphene or carbon nanotubes to silicon nitride to create ceramic nanocomposites gives rise to promising applications in a wide range of fields such as electronics, biomedical aids, membranes, flexible wearable sensors and actuators, energy systems. The presentation shows how the use of different reinforcing phases and sintering methods affects microstructure and as a result, mechanical properties, electrical conductivity and tribological properties of the final silicon nitride nanocomposites. The prospective future applications will be also discussed.