EuroSciCon

18th Edition of International Conference on

Emerging Trends in Materials Science and Nanotechnology

January 28-29, 2019
Barcelona, Spain

K Maslana et al., Nano Res Appl 2019, Volume 5
DOI: 10.21767/2471-9838-C1-031

Few layered tungsten disulfide/carbon nanotubes polymer based nanocomposites-synthesis and thermal behaviour

K Maslana, K Wenelska and **E Mijoska**
West Pomeranian University of Technology, Poland

Plastics, despite thier many advantages, are well known for thier flammability, generation of large amount of toxic gases and hazardous substances. Due to the growing use of these materials in everyday life and incrasing environmental requirements, the flammability of these materials is a topic that has recently become more and more popular. The aim is to make the polymers emit less and less heat during combustion while increasing the temperature of their ignition. Tungsten disulfide (WS_2) belongs to the family of transition metal dichalcogenides (TMDs) whose properties are comperable of those of graphene. WS2 monolayer exhibit very intresting properties, such as high in-plane carrier mobility and electrostatic modulation of conductance and very good thermal propeties. In this work we prove, that few-layer WS2 improve thermal proporties and reduce flammability of polymers. These effects were furher enhanced by the growth of carbon nanotubes on exfolieted WS2 functionalized with nickel and iron oxides. Flame retardant properties were investigated by thermogravimetric analysis (TGA), microcalorimetry and laser flash analysis. Comparing the obtained values of heat released during combustion, it can be observed that the addition of fillers reduces flammability compared to the neat polymers. It is revealed that these composites can provide a certain physical barrier and inhibit the diffusion of heat and gaseous products during combustion.

Biography

K Maslana is a first-year PhD student. During her Master's thesis she explored thermal behavior of 2D materials in commercial polymers. The results of her Master thesis are published partially in K Wenelska, K Maslana, E Mijowska, Study on the flammability, thermal stability and di usivity of polyethylene nanocomposites containing few layered tungsten disulfide (WS2) functionalized with metal oxides, RSC Advances, 2018. She continues her research interest in the field of fire retardant properties of molecular hybrids.

kwenelska@zut.edu.pl